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ABSTRACT

One in a series of five descriptive case studies dealing with innovation, this study on Norway elucidates the functions of the National Council for Innovation in Education (NCIE), an advisory council which was formed to regulate experimentation and reform in the entire Norwegian school system. With major emphasis on democratization, the objectives of current experimental activities in education focus on structural changes, learning process, curriculum role of the teacher, evaluation of student achievement, physical facilities and equipment, organization of the school, and the role of the school in society. The NCIE not only makes administrative decisions about school reforms but also expends resources and personnel to carry out the decisions. Strategies include central planning and control undertaken in close cooperation with schoolteachers in an attempt to implement and disseminate reforms throughout the whole educational system. Discussions in other chapters include a critical analysis of the NCIE; definitions and qualifications of experimentation and research, the process of innovation in education; an alternate model; and the nature of resistance and groups that resist change. (SJM)

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- NORWAY -

by

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PREFACE

The following case study is one in a series of five dealing with innovation in education. All the studies are descriptive in nature and, as the work of five different authors writing in their personal capacity, they represent five quite individual syntheses and interpretations of vast amounts of information. Yet the confusion that might be expected from this method does not result. What emerges from these studies is instead a reasonably coherent statement of educational responses to the post-war demands of many more people for more and better education.

Perhaps it is not remarkable that the demands have been exerted so consistently on such a variety of nations, nor that the response to them has for the most part been so quick and positive. The nations examined in this book are remarkably similar in that all have a long and honourable tradition of public education, an industrialised economy and a high standard of living. At first glance it even appears that their solutions to the problems posed by recent educational demands are unusually similar: structural reform, curricular reform, compensatory and/or individualised learning systems - examples of each are easy to find in any setting. Yet a closer reading of the five case studies reveals wide and interesting variations: in priorities, in perceived solutions, in strategies evolved or developed to implement them.

Such variety of course reflects to a large extent differences in 'national climate', that peculiar combination of values, objectives, aims and administrative tradition which, aside from language, makes a nation distinctive. The explication of these differences is thus a hidden theme of the five case studies taken as a whole, and an understanding of this hidden theme is necessary to illuminate the more obvious themes of change and growth.

An explanation of this point can be found by comparing, even superficially, Scandinavian countries such as Norway and Sweden on the one hand and the United States of America on the other. At least from the viewpoint of the outside observer, Norway and Sweden have much in common. Both relatively small in terms of population, they can also claim a remarkably unified social and value structure. Furthermore, their style - if such a generalisation can be made - seems to be to have a clear idea of goals and then to set about methodically reaching them. This process is aided by the existence of strong central governments which are able to plan and to legislate with a reasonably clear assurance that what they propose will be achieved. Thus there exists in Norway the National Council for Innovation in Education whose mandate it is to make reality of reform laws passed by the central Parliament. The Parliament, concerned in recent years with "large questions of the role of schools in Society", and sure enough of its constituency, has concerned itself largely with structural reform and new curricula - on a national scale.

The situation in the United States is quite different, even if the question of relative size of total population is ignored. The American federal government is based on a system of checks and balances so fine that it is often hard to determine either the source of impetus or its ultimate manifestation. The situation is further complicated by the well-protected existence of states' rights - particularly the control of education - and, once the issue of taxation is raised, by municipal and regional claims as well. Perhaps more important, the rich diversity of the American population inevitably means conflicting social and ethnic interests, values, and views of national priorities. The past decade of American life has indeed been one of fast-changing goals and objectives and of massive social upheaval. Much of the upheaval has connected itself to education and made demands accordingly: in the light of this political and social background, it is not surprising that American education responded by producing such a variety of innovations in every area and at every level that the final array can be quite bewildering, whilst at the same time providing a vast reservoir of experience for others.

England and the Federal Rpublic of Germany likewise provide differences quite distinctly their own. Writing of her own country's approach to recent educational change, the author of the English case study notes

> "... the English style is distinctive. You can seize on it instantly. There is no acceptance of common objectives, except in the most general sense which inspired the last major education act: the need to widen opportunities and eliminate the poverty both of individual children and of the public provision of education (1). There is no national plan for education, no law which specifies where development is necessary as in some OECD countries. There is almost no theory. The point is characteristically made in a recent major report on education (2): 'We invited the help of a number of distinguished educationists and professors of educational philosophy ... They all confirmed the view that general statements of aims were of limited value and that a pragmatic approach to education was likely to be more fruitful.'"

The reference to "two decades of non-reform" in German education, a phrase coined by Professor S.B. Robinsohn, is slowly becoming eroded, especially during the last two years, which have been marked by fundamental changes in many parts of the school system. With increasing co-operation between the Länder and with the initiatives of the new Ministry for Education and Science, the need for a more systematic approach to educational reform, and especially to educational experimentation, seems more important in Germany today than in many other countries.

Despite these differences in background and style, the five country studies do show one overriding problem in common: the need to change and improve their educational systems. Furthermore, as their experience increases, they all face the reality that explicit measures to facilitate the management of educational change are necessary, that innovation and improvement cannot be haphazardly left to chance.

I. THE NCIE

History of Educational Reform, 1935-1969

During the 11-year period from 1935 to 1946, five education acts in Norway attempted to unify the diverse elements of the education system. While the objectives were clear, the results were not always satisfactory, and many problems remained unsolved; so in 1947, the 'Coordination Committee for the Schools System' was formed. But during its five years' existence, it became clear that coordination of the present school system was not enough to solve all Norway's educational problems. The CCSS pointed out that new solutions must be found by systematic research and experiments in schools.

In 1954, the Royal Norwegian Ministry of Church and Education sponsored a special bill for innovation in education, which was passed in the Norwegian Parliament (Storting) on 8th July, 1954 (see Appendix 1). This made systematic research the basis for innovation in education. It was hoped, thus, to enable the education system to keep up with rapid changes in society. The former system of innovation instituted by CCSS evaluation and reports had been found time-consuming and inefficient. Structural changes in education had often occurred too late, and teaching was thought to have suffered from a lack of systematic research.

The Act applies to the whole of the Norwegian educational system, including general, vocational and teacher education. So experiments on the structure of the system are no longer blocked by divisions in the structure, Curricula, teaching methods and administration are also tackled, with change following experiment. In order to coordinate and direct both experiments and government evaluation and reports, a central administration was set up under the Ministry (see Fig. 3). It works in close cooperation with the Norwegian Research Council for the Sciences and Humanities (NAVD) and other research institutions.

The National Council for Innovation in Education (NCIE), which is attached to the Primary School Division of the Department of General Education, has advisory authority. All proposals for research and experiments are evaluated by NCIE, which is made up of experts in both education and research. Before any accepted proposal can be put into effect, it must be submitted to the 'expert advisory council' of the particular division in the Ministry concerned. Initiative for research can come from the administration, or from schools, or even from individuals. The Ministry takes the final decision, and the NCIE has then the full authority to manage the experiments and development projects. (See Chapter IV).

The Act provided for two new bodies - NCIE (originally it had seven members but since 1968, nine members), and the secretariat of NCIE. Both were established in 1954, but their influence was not very strong until the sixties: at first they suffered from lack of both funds and recognition. But now the secretariat has about 30 staff members and supports several part-time specialists, such as directors of experiments, research workers, consultants and technical production

staff. Also, in 1970, some 1,000 teachers were working under contract on NCIE experiments.

The first experimental work of the Council was an attempt to unify the lower secondary level of education. Experiments led to a new law, the Elementary Schools Act, which was passed on 10th April, 1959: for the first time in Norway there was a common law for both city and rural districts. This law also made it possible to extend the seven-year elementary school to nine years of compulsory education (usually seven years of elementary school and two or three years of 'comprehensive' school - an optional tenth year was also made possible). This extensive reform - leading to the nine-year school - certainly seems the most important educational reform in Norway this century: it was to be carried out by the NCIE.

Its success, particularly for the valley districts, can already be seen in the steadily increasing number of young people who are choosing to stay on at school beyond the leaving age of 16.

Before 1954, Norway had different laws for rural and urban communities. Educational opportunities varied considerably from one area to another according to local regulations and the condition of the local economy. After the seven-year elementary school, access to the next level of education (continuation school and junior high-school) was determined more by socio-economic background than by ability.

The first move was to put together the continuation school and junior school under one roof, still on a separate course basis. Then gradually the NCIE began to work on the reorganisation of the curriculum and the reduction of distinction between students choosing the general course and those choosing the vocational course (see Fig.2).

The greatest problem was the organisation of pupils in the main written subjects in the new comprehensive schools. The first attempt to solve this merely divided the students into two groups - those following the general course and those following the vocational course. But it soon became apparent that the level of ability within these two groups was not homogeneous. The second attempt divided the subjects into three levels of difficulty - allowing only those who followed the most difficult course into the senior high-school (gymnas). This system has not been entirely satisfactory either, as parents have tended to want their children to learn at the most difficult level. So since 1965, the NCIE has been experimenting with teaching/learning systems which allow instruction to be geared to the individual to a large extent.

During the period of reform, organisational and structural changes have led to experiments in teaching methods (see Section V). Among these are: preparatory classes in English given by teachers with little or no knowledge of English with the help of teaching/learning systems; teaching groups of different sizes; remedial classes; optional subjects; programmed learning for mathematics; individualised learning in Norwegian and mathematics; adding part-time work to vocational training courses. The reform of compulsory education has inevitably shown the need for reform of teacher education: experiments in the colleges started only in the sixties, and restructuring has been considered only in the past few years.

Early in 1969, the Council published a three-year plan; an outline of the plan is given below:

1. Intensified experiments at the elementary school level, with emphasis in three particular areas:

   a) pre-school and elementary instruction

   b) problems of streaming (including individualised projects)

   c) problems of education in sparsely populated areas.

2. Reform at the senior high-school level, with experiments in the following areas:

   a) new senior high-school model

   b) combined vocational and senior high-school.

3. Continued experiment and reform in teacher training colleges.

4. Intensified reform in special education.

II. OBJECTIVES OF REFORM

An attempt is made in the following section to present the general tendencies of experiment and reform; it is assumed that the type and extent of the tasks confronting Norway in the next few years will emerge from this picture. It should be recognised that the objectives described may be dictated by national considerations and, of course, that the aims and direction of change affect the strategy chosen.

Presumably, the common denominator in the extensive reforms undertaken is democratisation, the desire to attain a socially equal educational system in which each individual student is given the optimum opportunity for growth.

The objective of equal opportunity for all in education has profound social, economic, educational, psychological and political consequences. To attain this goal, not only external structural measures, but also changes in the nature of opportunity itself are necessary. This kind of change is only possible if a general positive attitude and political willingness for improvement exist. Another necessary precondition is that the situation favours research and experiment, with the real possibility that implementation of improvements in the educational system may result.

Norway, like many other OECD countries, has made great changes in her educational system. These changes have taken place mainly in the elementary and lower secondary school. At the present time, Norway is concentrating on the problems of the senior high school, higher education and teacher training. Another central consideration in Norway is the schools for handicapped children, and there is reason to believe that it will remain so in the next few years.

The direction and objectives of current Norwegian experimental activities in education are summarised under the following nine general subjects: structural changes; learning process; curriculum; role of the teacher; evaluation of student achievement; physical facilities and equipment; organisation of the school; the role of the school in society.

Structural changes. With other European countries, Norway is continuously working on structural reforms. The 9-year comprehensive school was brought into operation in 1954. Current development in this field concentrates on the upper secondary school system with a coordination or an integration of the vocational schools and the gymnasium. Structural changes will also take place in teacher education, in the decentralisation of universities and in the new forms for post-secondary and recurrent education.

Experience gained from the 9-year comprehensive school reform has clearly shown that structural change alone does not fulfil the goals of the reform. It is essential that developments in curriculum and in educational technology take place at the same time. This, however, means putting more resources into development work than has, until now, been possible.

The goals for structural reforms are political, social, educational, cultural and individual. As a main goal, access to further education is probably the most important. In this connection equality of educational opportunity is the main focus. There are, of course, also educational goals like establishment of flexible systems in which students do not meet irrelevant barriers. This again, of course, has implications for social mobility, and possibly also for the economy (at least for the individual economy).

One important aspect of structural change in Norway has been local school development. This is due to the fact that a more comprehensive system with less streaming into different types of schools enables smaller communities to have their own school. In a sparsely populated country like Norway, this is an important goal in itself.

Learning process. Today there is a more open attitude towards the individual's creative possibilities. This is true not only in aesthetic and practical subjects, but also in other fields such as the natural sciences, mathematics, ethics and social subjects.

A positive evaluation of the creative elements in the learning process would have consequences both in educational methodology and evaluation. Unfortunately, there is still a large gap here between intention and reality. Conscious effort is needed in order to retain and promote a general recognition of the more spontaneous motivations (curiosity, the desire to create, interest, etc.) and a watchfulness is needed so that the more external motivations (pressure from parents, marks used as punishment, etc.) are not allotted too much importance in the school's life and activity.

Most European countries still live with an 'encyclopaedic' school tradition. The rapidly increasing treasury of knowledge and changes in living conditions have necessitated the development of principles for selection of material in which ability to gain knowledge is given greater emphasis. Knowledge, in the traditional sense of the word, is then given a secondary position in relation to other aspects of education. Learning with insight and through logical thinking is favoured over more or less mechanical processes. Emphasis, particularly in the natural sciences, is placed more on inductive learning in which the students' own discoveries of the problems are central.

Within individual fields of study, also a shift can be seen from the subject matter itself to the development of proficiencies. Greater emphasis is placed on oral proficiency, both in the mother tongue and foreign languages; on ability to assimilate knowledge through new media like television; and on mathematical reasoning as in "modern mathematics".

Today the school is taking on greater responsibility for social education. This requires greater emphasis on methods and activities which promote the child's ability to gradually become independent and to lead an independent social life in a group activity.

Large demands and greater responsibility are placed on individual members of a highly developed industrialised society. The school recognises that such responsibility can only be borne by an individual who has high personal morals. A sense of responsibility and of ethical

behaviour are not achieved by authoritarian directives towards specific goals, but rather by developing the individual's ability to take an independent attitude towards life. This can be promoted by, among other things, greater responsibility for personal learning and independent work in smaller groups.

It should be the task of the school to provide students with experiences that increase opportunities for making intelligent choices. The human being is confronted today by far more numerous and more complicated decisions than ever before and therefore some preparation is necessary. Students should be taught how to make these decisions. However, well-intentioned advice and prescriptions are of little use in stimulating this kind of development.

Curriculum. The curriculum must be interpreted as something encompassing more than a certain amount of knowledge. It must be defined as the school's total life in which proficiencies and attitudes, the ability to learn and the acquisition of working methods, etc. are integrated parts of the whole.

The growing volume of knowledge and other rapid changes in society have led to renewed consideration of the choice of teaching material. Today the "normal" school curriculum is in a state of constant revision. The exacting demands of our age require that the subject matter studied be actually representative and be able to provide insights into life which are valid both for situations beyond the school community and for tomorrow.

Teaching/learning systems. In Norway, most of the developments in education are directed towards the development of new teaching/learning systems. Resources for innovation have increased and efforts are being coordinated to create these changes. This tendency makes possible an individualisation of studies which was previously difficult to put into practice.

Teaching/learning systems may be defined as those where a definite method of instruction, advanced subject material and a systematic instruction organisation are closely combined. As a prerequisite, such a system is tested on students before it is implemented. Development work in this field is based partially on the methodology of self-instruction and only rarely takes the form of programmed instruction in the usual sense of the word. However, it does retain the most important elements of the "instruction technology" that has been developed from programmed instruction.

Advanced learning aids systems have proved very expensive. Furthermore they require expertise in areas that have previously been given very little attention in the production of teaching aids, require co-operation among research, production and testing, and make new demands for co-operation between the publishing company and the national authorities.

There is also a tendency towards making the size of work and instruction groups more flexible. Both large and smaller groups of various sizes are being used according to the type of learning situation.

The class as the only study group is disappearing. Replacing it to an increasing degree will probably be flexible scheduling which will allow different learning situations.

Role of the teacher. The role of the teacher is undergoing rapid change. From being the recognised source of knowledge and the "examiner", the teacher is becoming more of a guide, a source of inspiration and an organiser of knowledge for the students. The teacher's new role leads to specialisation within the teaching staff, which again leads to "team-teaching" and other forms of co-operation among teachers. In his role as group leader, the teacher retains much of the oral contact he previously had as a teacher of a whole class.

New objectives, changing requirements for knowledge, proficiencies, attitudes and teaching methodology are having a profound effect on the role of the teacher. In the early stages of development work on teaching methodology, the emphasis was often to too great a degree centred upon teaching aids. Later developments have tried to treat the entire process of learning as a whole, taking into account elements such as inter-personal relationships, the acquisition of knowledge, and other aspects of the school's objectives.

As the elementary process of acquiring information becomes gradually dependent on supplementary means of presenting material, the teacher must take a role in the projects that cannot be handled as well in any other way. The function of the teacher as a guide is particularly that of helping students with self-criticism, primarily of their own achievements, promoting creativity and encouraging the formation and development of personal views. As the organiser the teacher must constantly help the individual student to find those teaching aids which are most suitable to the particular situation.

Evaluation of student achievement. Because of the retro-active effect that tests and examinations have on instruction and the importance which evaluation has for the individual pupil and society as a whole, all development work in school should be accompanied by an effort to find forms of evaluation that are in accordance with the objectives of the school system. The changed objectives described in the above paragraphs must also lead to a new consideration of the role of evaluation in the learning process.

The most important aspect of new thinking in the field of evaluation is the creation of a system for continuous evaluation, which would effectively help the student in the process of learning. Emphasis is placed on the fact that the measurement of results is to serve to inspire the student and give him the possibility of evaluating his own achievements. Diagnostic tests play an important role in more advanced instruction programmes, particularly in the teaching/learning systems.

Just as important is the fact that a continuous evaluation system would offer feedback to the instruction system, providing greater possibilities for worthwhile change. Typically, expanded work on evaluation methods leads to work on goal analyses.

In most countries examinations have served as the criterion for selection for further schooling and placement in employment. Today attention should be focused on both examinations and the school as a whole as the selective mechanism in society. There are many indications that the traditional examination determines distribution ability only to a very small degree. The necessity for systematic efforts to arrive at suitable admission tests with the greatest possible relevance to those demands which will be made of the student in future situations is becoming evident.

Physical facilities and equipment. Today there is a tendency to use school buildings and equipment during more of the working day. There are examples of the utilisation of buildings for up to 10 hours a day. This is partly due to evening instruction, partly because of study time at school, hobby activities and adult education.

With changes in teaching methodology, the physical layout of school buildings is also changing. The tendency is towards the greatest possible flexibility. The typical classroom will probably be less used, while larger rooms are becoming more common. This makes groupings possible either in an ordinary size classroom or in groups of various sizes.

The production of equipment for schools is becoming a big industry. In some countries emphasis is placed on very expensive equipment, as for the natural sciences. Other countries choose an intermediate solution in which some advanced equipment is combined with reasonably priced equipment, which has even been partially produced by the students themselves. It seems that the utilisation of special equipment varies considerably from school to school. The author thinks that the equipment should be looked upon more closely as an integrated part of a learning system.

Organisation of the school. In Norway, the organisation of the school has traditionally tended to be rather static. Therefore, it is necessary to increase self-government of the individual units and create an organisational system with a dynamic structure.

With the changed role of the teacher and a different kind of teaching methodology, students find themselves in a new position in the organisation of the school. "Student democracy", i.e. increased rights for students in the decision-making process, is a question under current consideration. This question, however, is a part of the question of "school democracy", and should be seen in this context.

Within the individual school, there is a tendency towards greater job specialisation based on special training for the various categories of staff (and not the least the school authorities). Co-operative routines are developing among the various members of the school staff and between the staff and institutions outside the school.

Role of the school in society. The school is no longer considered to be a closed social system in Norway. Instead, attempts are being made to find areas of contact with the society around it, both in the local community and in the life of the society as a whole. In the local

community, co-operation is being developed for leisure time activities, between teachers and youth leaders, between school and home, etc. In some countries, such co-operation is regarded as an integral part of the educational plan itself, and tendencies in Norway indicate a development in this direction.

Contacts with society in general are also being sought. Representatives of society as a whole participate directly in the designing of the school's curriculum. This is true for the initial drawing-up stage as well as for the process of constant revision of curriculum plans. The "practical vocational orientation" in Norway is one example of this development.

III. STRATEGIES OF THE NATIONAL COUNCIL FOR INNOVATION IN EDUCATION (NCIE)

The expert advisory council called the NCIE was formed to regularise the procedure of experimentation and reform of the entire school system and bring control under one administration. It was further understood that the NCIE was not only to make administrative decisions about the reform of the school system, but also to expend resource and personnel to carry out these decisions.

The first project of the NCIE was planning for the development of the 9-year school. The strategy used in this process was, for the most part, the traditional method of central planning and control carried over from the 1947-1952 period when the CCSS was in operation. The attitude persisted that it was possible to realise changes in the school system under previously devised reform plans.

The NCIE recognised, of course, that this strategy could only be successful if planning were based on pedagogical realism and on good curricula. The planning stage was therefore followed through by several publications on principles and practice for the 9-year school and teacher training.

All work was carried out at the NCIE rather than in the schools themselves. Teachers and other experts were brought in as consultants. All evaluations, decisions and changes were made at the NCIE.

There was a great deal of disagreement both as to the principles and the actual form of the 9-year school. The communities themselves were allowed to choose whether they would introduce the 9-year school or not. However the NCIE retained responsibility for the method in which this was to be carried out, the objectives of instruction, the form of organisation, the curriculum and the kinds of examination.

By 1964 the strategy of the NCIE had begun to change, the extensive reform of the school system in the form of the 9-year school had revealed a number of pedagogical problems, and work of a more systematic practical nature was begun.

The strategy of systematic experimentation in the schools can only be undertaken in close co-operation with the teachers of those schools. This co-operation necessarily leads to an intimate dialogue on principles and practical possibilities.

The starting point for this strategy was the use of the "dissemination theory", which may be defined as a change-strategy where centrally planned reforms are implemented and disseminated throughout the whole system. The purpose of using this strategy was to bring about changes which could lead to reform of the whole educational system. (See Chapter V for further details).

In principle, this strategy leads to co-operation with the teachers in the schools. In actuality, however, such was the case with only a relatively small number of teachers and schools. Usually the NCIE has itself taken the initiative for the practical experimentation projects.

The introduction of change means that teachers are given extra work that may often be a great burden. This requires readjustment and expenditure of time and money. Therefore, the strategies of reduced teaching duties and added economic compensation were tried as a motivation for experimental activities.

The strategy of reduced teaching load was first used during the early period of introduction of the 9-year school. The teaching time for all teachers was reduced by one hour a week to ease the problems of readjustment. This hour was used for co-operative work among the teachers and for supplementary and further education in informal groups in schools.

During the later period of practical experimental work, each participating teacher was given a reduction in teaching duties for every course given according to an experimental plan.

The strategy of economic compensation was used when the experimental work was accompanied by special projects: for example, the construction of materials, report work, evaluation, etc. Compensation was either in the form of additional money or periodic leave of absence of about a week at a time. However it is obvious that economic means only partially compensate for the extra work which confronts the teacher in the process of change.

To what degree is economic compensation or reduction of teaching duties the right means to use to motivate teachers to undertake experimental work? To what degree can the teacher be expected to readjust to new daily work and to what degree must extra financial compensation be used to motivate experimental activities? The NCIE has long been aware that these questions must be considered in relation to the whole role of the teacher.

IV. ASSESSMENT OF THE STRATEGIES AND ACCOMPLISHMENTS OF THE NCIE

The following critical analysis is based solely on the personal judgement of the author. A systematic assessment to explore, for example, the views of teachers, parents and other interested groups, has not yet been undertaken.

Position of the NCIE in the MCE. The Innovation in Education Act gives broad powers to the central administration to make changes in the school system. In the author's opinion, the major changes in the development of the Norwegian school system are mainly due to the position which the NCIE was given in relation to the Ministry of Church and Education (the decision-making body) and to the school system (the operative body).

In Norway an organisation for research and experimentation is usually either attached to a university or exists independently. It normally has a "safe" position with a great deal of freedom in the traditional sense, which is often at the expense of its ability to take action. The NCIE however, in addition to its research and experimentation functions, has been given unusual powers to act to change the school system. If this is desirable as a main objective, the position of the NCIE in relation to the MCE and the school system has been well chosen.

The NCIE is an advisory body to the MCE. In practice this has meant that the NCIE has had executive authority in the implementation of the 9-year school reform. The MCE takes the final decision on NCIE proposals, but in reality has been dependent on the educational expertise of the NCIE.

Following the resolution in the Storting on the principles of reform for the 9-year school and particularly since the Elementary Schools Act of 10th April, 1959, the NCIE has in practice acted as an administrative body for putting the 9-year school into operation. This has led to direct contact with communities, schools, and teachers. From the point of view of the NCIE, this contact has seemed quite satisfactory and had made possible a flexible readjustment to new problems.

The NCIE has been given a strong organisational position for implementing change which was previously politically determined. However, every reform activity in the school system confronts the NCIE with problems of evaluation. In all administrative, organisational, economic, social and educational evaluations there is a choice between alternatives. The administrative body thereby has a decisive influence on the direction which the reforms take. The question is to what degree the NCIE, in its organisational position, has managed to solve this problem in a factual and objective manner.

In addition to the aim of implementing reform, every organisation for research and experimentation must have a further objective. Its

task is not to make changes without delay, but to introduce improvements in the school system based on the intentions which the peoples' representatives had for the reform. Clearly the capacity for objective evaluation is required. This raises the question of whether an organisation responsible for implementation of reform can, at the same time, be completely objective in relationship to the practical results.

The main criticism of the activities of the NCIE is that during its first 10 years it was too limited by its organisational position (in regard to the MCE and the school system) and that it did not have an adequate capacity for objective evaluation. In addition, reforms meeting major aims were often implemented in spite of the obvious negative effects they could have.

The difference between an organisation for research and experimentation and an administrative organisation should be that the former remains free of political pressures, in so far as practical and objective experience shows that intended aims cannot be achieved. In the author's opinion, the organisational attachment of the NCIE to the MCE has been a weakness in this connection. The NCIE has not managed to differentiate adequately between change and improvement. This becomes most obvious in the implementation of socio-political aims.

Early in the reform work, the attitude of the political bodies was marked by relatively simple optimism with very few criticisms of an educational nature. The author believes that later developments have shown that even political aims can be achieved but that their accomplishment must be based to a far greater degree on research and practical experimentation.

School reform. A school undergoing a continuous process of development is one in which work must constantly be in a state of revision and improvement. To make this possible there must be an organisation that has the power and capacity to carry out improvements and the ability to make critical objective evaluations.

Curriculum requirements change rapidly according to external social conditions. The school therefore must encourage the formation of groups representing the various sectors of society which can continuously carry out analyses of objectives, subject materials, and current needs and which can revise the curriculum accordingly.

The contact between the business and industrial sectors and the vocational school has traditionally been good. However there are no mechanisms that relate the needs of other interest groups to the decision-making process. Therefore the necessary basis for change is often lacking.

This lack of adequate contact with outside organisations as a basis for change is also true of the school's relationship to other segments of society such as the home and places for leisure time activities. The needs which these environments express to the school for knowledge, proficiencies and attitudes are often so diffuse that it is very difficult to use them as a basis for continuous revision of the curriculum.

For these reasons, it is important to expand those groups both inside and outside the school that together can define and improve the duties of the school.

Rolling reform must include work on more than just the curriculum. All factors which influence the learning process must be the object of experimentation and constant improvement: the school society, the relationship between students and teachers, the roles of both. The administrative and organisational aspects of the school's work must also be given far more attention.

Most important of all, the school system as a whole must be taken into consideration. Changes in one type of school or one part of the system automatically influence other parts as well. This is particularly true of the institutes responsible for preparing teachers for the type of school undergoing change.

The NCIE has not expanded its administration enough to assure adequate rolling reform. Curricula have been in a continuous process of revision but the basis for these revisions has been somewhat flimsy. This is not due to a lack of understanding of these problems on the part of the NCIE, but rather to a lack of resources and qualified research workers. In addition, the expertise necessary for the evaluation of the qualitative needs of education are not to be found in Norway. Even business and industry do not have any organisations which can articulate the needs of the various work sectors.

Teacher training. There may be disagreement as to the role the teacher will play in tomorrow's schools. Few will disagree, however, that he is an essential actor in today's schools for the achievement of the aims of reform. Indeed it is likely that his role will become even more important especially if the imperative to improve teacher quality continues in the years to come.

In Norway, as in most other countries, the teacher training colleges and the elementary schools are subordinate to different divisions within the ministry. (See Figure 3). This may be one of the reasons why contact between them has been poor. There does not seem to be a mechanism in the school system that automatically results in changes in teacher education. The MCE has tried to correct this situation through the establishment of a co-ordinating committee between the Council for Teacher Training and the NCIE.

In the coming decade the NCIE is confronted with even greater co-ordination problems in the relationship between the teacher training institutions at the universities and the senior high school. It is difficult to imagine a thorough reform in the senior high school system without comparable changes in the education of teachers. This will be difficult organisationally and administratively. It clearly raises the question of an expansion of the mandate of the NCIE, which at present has no authority for experimentation and reform within the universities.

The difficulty of carrying out reforms in the teacher training colleges is partly due to the division of teacher training into a two-level system beginning at the comprehensive school level. (See Figure 4). Before the 9-year school was put into effect, the universities were

responsible for the education of junior high school teachers, special teacher training colleges for continuation and vocational school teachers, and general teacher training colleges for elementary and continuation school teachers. Because of this situation, effective co-ordination of teacher training has been very difficult.

This situation has presented the teacher training colleges with a dilemma. The plans for instruction in minor subjects had been thought of as an alternative to the university curriculum plans, but in general have been based on them instead. This has often been necessary in the discussion about qualifications that is very current between the universities and the teacher training colleges.

Experimental work in the teacher training colleges has mainly served to solve the current problems of the 9-year school, that is to qualify a sufficient number of teachers. This has been a very important task. During the period of enormous expansion which the elementary school has experienced, the demand for teachers has not been met either quantitatively or qualitatively. Today, although the 9-year school is in operation in two-thirds of the country, there is still a lack of fully qualified teachers. In the near future, however, this will no longer be a problem.

Several experiments have been undertaken particularly on the curriculum. To a large degree, the teacher training colleges have taken over instruction of minor subjects at the university level to give the teachers in training the necessary qualifications for teaching at the comprehensive school level in the 9-year school.

When should reform begin in the teacher training colleges which prepare the faculty for those schools that are to be reformed? Presumably the ideal would be that the teachers be qualified before reforms in the schools where they are to teach are put into effect, but in practice there are several problems in the application of this principle.

Reform requires constant changes. These changes are particularly numerous during the first years of reform. If the objective is to educate teachers for tomorrow's school on the basis of future school needs, difficulties arise because these needs cannot be clarified until significant experience has been gained from experiments now under way in today's schools.

The NCIE has not managed to carry out extensive reform in the teacher training colleges. Teaching plans, student-teacher relationships, methodological structure, and the relation between theory and practice have not been reshaped to correspond with the 9-year school reform. In the past few years, however, a great expansion of experimental work has been undertaken, and the author believes that this will bring constructive results in the near future.

Centrally-directed reform of the school system. The creation of the NCIE showed greater than usual flexibility on the part of the central government, even so, several of the characteristic features of centralisation can be found in the work of the NCIE, particularly during its first 10-year period.

The much-discussed centralisation of the comprehensive schools throughout the valley districts provides a useful illustration of the unfortunate aspects of a centrally-directed experimental activity.

In the beginning the NCIE believed that fully adequate educational opportunities were possible only at schools of a certain optimum size, preferably having at least 4 classes at each level. This was partially explained by the organisation of the school and partially by the necessity for a "fully adequate choice of subjects", which the NCIE considered essential.

The creation of large school units meant radical centralisation of school facilities in many of the valleys. Long distances to schools, the abandonment of school sites which were full of tradition, and the construction of boarding schools were necessitated by following this course.

Naturally, the resistance to this idea of centralisation was very strong in the rural valley districts. Norway, a country with four million inhabitants living in the varied terrain of fjords, mountains and islands has, of course, a number of districts where the school itself is a cultural centre of decisive importance.

The reaction against the centralisation policies of the NCIE took many forms. Several communities delayed the introduction of the 9-year school as long as possible in the hope that developments might turn in the direction of smaller school units. Indeed, recent developments have clearly taken this direction.

It took several years before the NCIE was willing to re-evaluate its plans for large school units. The attitude of the NCIE was understandable. Of course, a lack of resources and qualified personnel, and an experimental design without objective evaluation criteria did not offer adequate opportunities for effective communication, rapid revision or the necessary service activities.

It is obvious (and presumably was to the NCIE at the time) that good educational opportunities cannot be provided through the size of school units alone. Purely external organisational solutions like this can only form a framework for the school's activities. If instruction problems are to be solved, educational measures are required. As long as it was fairly improbable that such extensive educational experiments could be undertaken, the organisational structure was chosen that had the greatest possibilities for success. Theoretically, large school units would have a better collective teaching staff, greater choice of subjects, better equipment and better administration.

Developments since the early 1960's have shown that large school units do not always produce better educational opportunities. Later investigations (based on nation-wide norm tests, among others) made by the NCIE indicate that schools with as few as 2 classes at each level offer satisfactory educational opportunities. This size school will very probably be the most widespread when the 9-year school has been put into effect throughout Norway.

Of course, a reduction in the size of school units means more comprehensive schools in the country, fewer and smaller boarding schools,

and shorter distances to schools. It should be added that experimentation by the NCIE with small comprehensive schools in the 1960's has had positive results. The NCIE is presently working intensively to improve the organisation and economy and the educational opportunities in these schools.

The above illustration of centrally-directed reform can be typical of the criticism aimed at the NCIE. In its working strategy, the NCIE did not pay sufficient attention to local reactions. It might be said that a productive dialogue or a healthy communication process was not always in evidence.

The conclusion that can be drawn from this illustration is that the NCIE, as an administrative body charged with the task of putting the 9-year school reform into effect, played the traditional administrative role to a very large extent. Systematic controlled experiments were not made to act as regulators of the decisions that were made. This is the danger confronting the NCIE with its mandate and its organisational position in relation to the decision-making authorities.

The NCIE approach to systematic experiment. In Norway, educational experimentation in schools has been going on as long as schools have existed. This type of experimentation can be defined as "the development work of the individual teacher". (See Chapter V). The systematic experiments in education directed by the NCIE is defined as "experiments that aim at introducing new elements into sections (large or small) of the total school situation, that are tested on the basis of systematic planning and follow up and are evaluated on the basis of previously set criteria". It could be claimed that the NCIE, as an experimental body, should consider such innovations to be its main task.

Criticism is justified on several central points. Within the framework of the reform drawn up, there were a number of unsolved educational problems which can only be solved through research and systematic practical experiment. Such measures were not undertaken until 10 years after the beginning of experimental work in education.

Although the work carried out by the NCIE should have formed the basis for a number of interesting research projects in the schools, actually such research was stimulated only to a very small degree by the NCIE. Partially due to a lack of resources, but mainly to a lack of confidence in the sciences which would have been involved, this led to a separation of experimental work from research. It is possible that Norwegian school research would long since have developed researchers to work on the everyday problems in the schools if the NCIE had made greater efforts to prepare its way.

Co-operation with research institutions was a prerequisite for the NCIE mandate. During the first 10 years of NCIE activity, this was essentially a paper regulation. Even though resources were small a gradual recruitment of research workers for projects in connection with NCIE work would have meant a great deal to an active research environment in Norwegian schools. On the other hand, it must also be stated that the universities and their leading research workers did not utilise the opportunities either. However, it is not appropriate here to criticise the role of the university.

In the author's opinion, criticism of the NCIE for a lack of follow-up and evaluation of its experiments is based on partially incorrect premises. First of all, practical experimentation was the main purpose for establishing the NCIE. Its work was to be reform based on previous political decisions. With the meagre resources the NCIE had at its disposal and its continued lack of scientific personnel, it would be quite unreasonable to expect scientific follow-up of the reform work. It can also be asked whether scientific methods had yet been developed which could have made a total evaluation of the effects of extensive school reform. There is reason to doubt this.

The "dissemination theory" strategy used by the NCIE is not an unusual approach to experimentation. The approach has three steps (see Chapter V, and Figures 5 and 6):

(a) An experiment in the preliminary stage is tried out in a few schools. Evaluation and revision are made after one or two experiments. The teachers are usually especially well motivated and very well qualified.

(b) The field phase is a stage in which the completed teaching aids and teacher manuals are tried out. The teachers are the regular teaching staff of the school, but they are usually given a training course in advance. The field phase could cover from 50 to 300 classes.

(c) If the field phase is successful, the project will be introduced in the whole school system (operative phase).

This strategy is based on experiences from other sectors of society, primarily the agricultural sector.

After 1963, the idea of special experimental schools was discussed. The analogy to agriculture with its experimental farms is quite interesting. However, because of the experience of some other countries, such schools were not established. Experience had shown by that time that even excellent experiments at these special schools were difficult to "disseminate" into ordinary schools.

Instead, the NCIE chose in the beginning to establish experimental agreements with two communities in the vicinity of Oslo. Ease of communication was one of the advantages of this choice. In addition, both communities were in the process of putting the 9-year school into effect. The objective was to initiate more systematic practical experimentation in the schools in these two communities.

These communities were responsible for the "primary experiments". Several good projects were developed in these schools during the primary phase. A number of good ideas and several very competent teachers helped make this work an important part of the NCIE programme.

The teachers of course were given special terms for carrying out this work. A reduction in teaching duties and sometimes cash payment were the main means of compensation. Supplementary courses, scholarships and contact with NCIE consultants were also used.

Several experiments are now taking place in the schools. None of them, however, has as yet been undertaken on a nation wide basis (the operative phase). However, one of these experiments "project teaching, study techniques and annual planning" had been widely disseminated long before the field experimentation was finished as schools all over Norway on their own initiative began to apply these measures.

The most important objection to this experimental strategy lies in the modest dissemination effect the experiments have had. Even within schools where primary experiments have been carried out in selected classes, the experience has not spread to the rest of the classes. Schools in the same neighbourhood have for a number of years been unaffected by these experiments, and schools in surrounding communities have shown very little interest in them.

This lack of dissemination may be due to inadequate information. Motivated teachers could be informed through the NCIE annual report to the MCE which is published and sent to all schools throughout the country. However, with today's increasing flood of publications, this form of information is not enough.

Lack of dissemination may have other explanations. Teachers may not have been convinced that the experiments are justifiable. Evaluation may have been poorly founded. Equally, many teachers may be frightened away by the extra amount of work that educational re-organisation requires.

The main reason for the lack of dissemination, in the author's opinion, is probably that the experimental strategy itself is not good enough for all levels of experiments. If experiments are to fulfil their aims in education they must be based on one of two possible conditions:

(a) Evident benefit to teachers. Teachers must feel that the change is beneficial and necessary to them. Those experiments which have been thoroughly tested must be of such persuasive quality that teachers feel they represent an important step forward which must be taken in spite of the various readjustment difficulties.

Experiences in other sectors where change is implemented show that this kind of conviction rarely occurs if a person does not feel that he is in an exposed position. For example, a businessman will quickly change his old methods if they lead to a deficit. He has relatively simple and clearly defined criteria as the basis of his evaluation, the operational results. In education, where so many objectives are relevant, the individual teacher will be more free in his evaluation. It is seldom that he will feel directly threatened.

A process of change that comes as a challenge from the outside, for example, from the NCIE, must build on information which can convince the teacher that the change will actually improve the teaching situation.

(b) Teacher identification with change. The other condition for dissemination is that the teachers themselves have helped to make the changes. Only in this case will most teachers identify with the change.

Through gradual involvement in the creative work of a project, the teacher who is perhaps initially an opponent of the project often becomes convinced of its justification.

Experience gained from preliminary experiments and in part from field experiments show that it is this involved teacher who changes his methods of instruction. Field experiment teachers are chosen on a voluntary basis and participate to a certain extent in the evaluation of the experiment.

If the hypothesis is valid that existence of one of the two (or both) above conditions is essential, what chance has the traditional "dissemination theory" of being successful?

Even the Norwegian school system with all of its centralised leadership, cannot force a teacher to readjust (except to changes in the curriculum). To what degree is it possible to get the majority of teachers to take part in development work as long as the change necessarily means a great burden of work? It is the author's opinion that this is possible only if the project itself is so convincing that it is quite impossible to ignore its value (the first condition above). There are very few such projects. In change that the teacher does not feel to be completely necessary (because he is not sufficiently convinced), the burdens are too great. Built-in mechanisms necessary for such a process of growth are not part of the structure of the teacher's job.

If changes considered valuable are to be carried out by means of less convincing projects, it is of course far more difficult to put them into effect in the school system. How then can they be put into effect? In traditional dissemination theory only a very small number of teachers take part in the development work (teachers in the primary experiment phase). Later, the teachers take part in an already developed project that other people have prepared. The NCIE experience has shown, in the author's opinion, that it is not possible to get most teachers to participate at the later stage. They do not feel this to be a part of their work.

In so far as it is undesirable to base continuous development in education solely upon the large and convincing practical experimental projects, another strategy for change must be tried. In Chapter VII an alternate model for change to that based on dissemination theory is discussed. It is important to produce a model for change in education which offers both interaction among teachers, school and school administration and maximum opportunity for the NCIE to promote various kinds of innovation.

V. EXPERIMENTATION AND RESEARCH: DEFINITION AND QUALIFICATIONS

The following definitions and qualifications are not intended to draw rigid lines between the various activities of experimentation and research. In many experimental projects, these distinctions are meaningless, and in all cases the various types of experimental work have a great many features in common.

Most important, the Norwegian school needs all the types of experimentation and research described here. These efforts must satisfy the "quality demands" which may be presupposed as conditions for their use. For Norway this means far more systematic planning of the projects, closer co-operation and more effective organisation.

In the context of Norwegian education, the word "experiment" has been used in several ways. The NCIE has been working on experiments within the school system for many years. The projects have been of many types, the working methods have differed and the results have been varied.

The 9-year school innovation, characterised in this paper as a reform, has often given the impression that experimentation is synonymous with a different school system.

On the other hand, experiments have been equated with the developmental work of individual teachers. It is not unusual, for example, to hear in a senior high school the word experiment used to describe a teacher's use of a non-prescribed textbook, even though the curriculum remains the same.

In other cycles, the word experiment implies certainly the presence of strict scientific requirements.

The following paragraphs attempt to clarify these varying ideas. Of particular concern are the various preconditions for experimentation, the requirements for objective control, and for the generalisation of the results.

School reform. School reform in Norway will always mean extensive intervention in the school system, in its structure, pattern of organisation, content and methodology, and often in addition it will affect administrative and financial conditions.

Such extensive changes will always be prepared by decisions and committee evaluations in the MCE, but can only be put into effect by a political decision in the Storting. In most cases the Storting will make a decision on a new law or a provisional bill before any innovation or educational reform is introduced. In other words, the NCIE does not have the power to make the decision to put a reform into operation.

In some cases, and in the further expansion of innovative activities, there is a possibility that the Storting may to a greater degree base its decisions on knowledge and experience gained from experimentation and research. This is true only to a very small degree at the present time.

Thus, a school reform is based on a political decision. The policy of the Storting has been to consider in the broadest possible perspective the role the school is to have in society. During this century, the tendency in the development of the Norwegian school system has been towards greater equality in the educational opportunities for both city and rural people, increasingly longer compulsory education for everyone, longer comprehensive education, greater social justice in educational opportunities and increased educational resources. Today education is the government programme which costs the Norwegian taxpayer the most money.

Part of the NCIE mandate is to carry out reforms in the schools. The most difficult and most decisive question in this work is how the NCIE regards its role. As long as the mandate given it by the Storting is interpreted as a limited one with little possibility for deviation, it is difficult for the NCIE to avoid the role of an administrative body (not formally but actually). If however the mandate is interpreted as a broad outline for action with the possibility for adjustments and revisions, the NCIE can choose its role much more freely. In order to make a reform possible, all school bills are gradually being given such a broad definition. Therefore the author believes that the NCIE should regard itself as a body having as much independence as possible and one which puts special emphasis on objective evaluation of practical results.

What possibilities are there today for objective evaluation of reform work? Objective evaluation, the author believes, lies in the possibility of close co-operation among experts in the various social sciences and experts in other fields, for example, economists or architects, who have some connection with the problems raised by a reform.

It should be recognised that educational reform has widespread consequences for social development as a whole. If it is desirable to direct development, a research environment that is problem oriented in relation to overall development must be established. For example, it is not certain that educational research is the most important science in the planning, execution and evaluation of a reform. Research on how recruiting, selection and environment affects school-home and school-work problems may be the most central effort in relation to social goals. The most important thing, however, is to achieve team research across traditional scientific boundaries.

Only when a reform is followed up in this manner is it possible to draw general conclusions. In putting the 9-year school into operation, the NCIE was confronted with such great problems that research-oriented follow-up was nearly impossible. Today however it is possible to set up a research environment for the reform work to be carried out on the senior high school system.

Any reform has to be followed by continuous revisions which imply curriculum changes in the broadest context. This work should be the responsibility of the ordinary administration. The NCIE's responsibility is to introduce the major changes and find practical solutions to the new problems.

Systematic experiments. Systematic experimentation means the introduction of new elements into sections (large or small) of the total school situation which are tried out on the basis of systematic planning and follow-up and which are evaluated on the basis of previously set criteria.

In principle the process of experiment is "scientific" in that it requires systematic thinking and evaluation based on the greatest amount of objective information possible. (See Figure 5). Even in limited experiments, however, traditional scientific methodology will be difficult to apply. For example, in the introduction of larger teaching/learning systems, results of objectives analyses and pupils analyses lead to a plan that is so different from traditional instruction that not even the achievement in the discipline is comparable to ordinary instruction. The kind of innovation and the objectives will thus, to a great degree, determine the possibilities for systematic evaluation.

The process of experimentation may be looked upon as consisting of 5 major steps: planning, construction, practical experiments, evaluation/revision, and dissemination (see Figure 5).

Planning requires extensive work to develop the idea which is based on certain needs and on which the project is built. For example, it is often desirable to undertake analyses of the capabilities of the pupils, the validity of the method, etc. In this case, it is necessary to present material and carry out a small "exploratory test".

In the planning stage it is also necessary to have as great access as possible to information on similar efforts from other places in the world, together with information gained during the qualifying stage from those who are to participate in the experiments.

The idea of preliminary experiments is that planning can be altered according to the results. Until the present time, changes in planning were based on teachers' reports and achievement tests.

It is important to attach evaluation experts to the process of practical experimentation in education as early as the planning stage. They should take part in the qualifying of the teachers participating in the experiment, help carry out the primary experiments, and direct the work of evaluation.

Systematic thinking in experimentation means that current experiences lead to current changes. The work of revision not only affects the ideas of the planning stages, but also leads to changes in the qualification of teachers, practical planning, curriculum, instructional methods and evaluation.

Only by following these steps is it possible to arrive at learning materials, a teaching method and a form of organisation that together can give the desired result. The aim must be to create a plan that will guarantee the school the promised results.

Developments by individual teachers. Educational development has never been dependent on systematic innovations. Rather, the teachers themselves have always had the responsibility. Even though the requirements for quality today demand extensive co-operation between teachers and other experts (see previous section), it must be remembered that development will depend on the individual teacher's efforts.

In Norway it is customary that individual teachers test new educational ideas in their own teaching. It is difficult to give any statistics on how many teachers are carrying out experiments of this type. However, the number of registered experiments alone is impressive.

A typical feature of this kind of development work is that it is based on the ideas of the individual teacher. As a rule it is carried out independently. Obviously it is important for the teacher to prove the feasibility of his idea. He is highly motivated, and there are few factors that contribute more to good teaching than this. An improved instruction situation for the students often results.

The transfer value of such experiments is rather dubious, as it is doubtful whether other teachers would be able to carry through a plan devised by one teacher to suit particular conditions - and achieve the same results. However, in some cases such experiments lead to larger experimental projects that can be the basis for a later sustained project which is more broadly based.

It may be agreed today that the most important aspect of development work is the strengthening of the more systematic experimental work. However, the author feels this may be unwise if it is done at the expense of development work by the individual teacher. The importance that such a renewal of the instruction plan has for the teacher, his colleagues at the school and his students must not be forgotten. The demands of systematic innovation must not be allowed to discourage the individual teacher nor to cause him to consider his efforts worthless. The former would be unfortunate; the latter most probably untrue.

Innovation by demonstration. The main objective of systematic experimentation in education is to put innovations into operation throughout the whole school system. The results must be of general value.

The value of the "demonstration innovation" is perhaps that it serves mainly as an individual example of the possible. It would be unrealistic to think that the experiment in its full breadth would immediately be applied elsewhere. Educational problems, personnel problems and economic problems would prevent this. On the other hand, such an experiment might give birth to certain changes in the system, mainly because it helps to create a changed attitude towards the problem to be solved.

Certain results may be achieved by this approach, but at present only by use of unrealistically large resources, specially qualified teachers and specialised equipment, etc. For example, it is of course possible to show that children can be taken from slum districts and helped to achieve just as well as children from higher social classes, if very large resources are used. Such an experiment would have value as an example. It would perhaps convince the political authorities of the necessity for allocating funds to specific sectors. It would change the attitudes of the teachers, parents, students and taxpayers!

The "demonstration innovation" is a type of experiment which is very little used in Norway. The great effort and resources which must be put into such an experiment and the varied results which ensue, make it unsuitable as a systematic innovation. However it could be the beginning of a large-scale reform.

Curriculum development. Up to the present time in Norway, curriculum development has taken place through committee work, and has mainly been seen as revisions of content and timetable. Using committees is often inefficient. Such a working method should be replaced by systematic and continuous revisions, a part of rolling reform.

There are several reasons why the committee work method is no longer satisfactory. The changes within individual disciplines take place so rapidly that continuous revision is necessary. Didactic and methodological research constantly result in new information for the construction of curricula. Changes in curricula must have their starting point in systematic testing. Curriculum changes imply changes in the total learning process. It is then an innovation which has to be dealt with as an educational technology-process.

Prerequisites to continuous curriculum revision are expanded co-operation among "product users" (those who engage graduates, for example, the university, industry, etc.), research in individual subject fields, international information and educational research. As these conditions are lacking in Norway, it is important that their development becomes an objective. The possibilities for Scandinavian and international co-operation in curriculum development are under consideration (see Chapter VII).

The role of educational research in innovation. In Norway, a sharp dividing line has traditionally been drawn between experimentation on the one hand and research on the other. This line has been particularly marked because traditional experimentation has lacked many of the conditions necessary for systematic experimentation in education. On the other hand, the research tradition has been marked by problems of fundamental research, and particularly educational research. Only in recent years has this picture begun to change.

Common to systematic experimentation and educational research is an advanced systematic thinking. It is difficult to evaluate the importance of the two different forms of systematic thinking. This is, in the author's opinion, more a question of nuance in the set conditions than a qualitative difference.

Educational research in this context must be considered as the clarification of school problems with the aid of scientific methods. This means that educational research, no matter how practically oriented, must work on the basis of reliable data. This again sets special requirements for the practical research situation.

Traditionally, the objectives of educational research have not included participation in the process of change. The purpose of research has been rather to ask questions and to seek answers. This must continue to be its purpose. Whether it should become involved in the actual process of change is a question of values of an ethical and practical character.

The answer is not so simple and lies outside the province of this paper.

Traditionally, perhaps, school teachers have considered experimentation more useful than pedagogical research. This of course is impossible to judge. The truth is obviously that there is an interplay (active or passive) between experimentation and research that makes these forms of development dependent on each other.

There are a number of contact surfaces between experiment and educational research. Before a reform or an experiment can be put into operation, the problem itself must be defined. Research can help to clarify existing conditions. Thereby it can also help to direct the experimental work towards the most central objectives for change.

It is necessary to make research co-operate with experimental work. If this is possible, there will be a solution to both economic and organisational problems. The requirements for qualifying researchers must be considered in these plans.

Research projects should be organised as larger co-operation projects. Since this will be expensive, these research projects must also be given priority.

Can the research workers' own wishes be met? For these projects he will not be as "free" as in "self-developed" projects. The author believes that society must be allowed to "buy the services" of educational research workers. This means channelling resources to applied research in accordance to the needs society has for reform and experimental work.

The importance of systematic thinking, particularly in experimentation, has been mentioned previously. (See page 32). This is true of the planning stage as well as of the evaluation stage. Educational research has a long way to go in Norway before it will be able to participate fully in this process. One of the reasons for this is the problems of recruitment of researchers which are related to traditional requirements for qualification for scientific positions. This has led to a lack of instruments suitable for the evaluation of practical experiments. Some work has been done, however, and there are positive signs that the work has now entered a health phase.

VI. THE PROCESS OF INNOVATION IN EDUCATION

In the preceding pages, the process of innovation within the framework of NCIE activities has been described. It would, of course, be naive to believe that school development is solely dependent on formal experimental work. It has already been shown that even the idea of experimentation includes a great many diverse activities. This means that developments take place under very different conditions.

Outside forces which influence innovation. In order to understand thoroughly the forces which determine the developmental work of the school, it is necessary to discuss those influencing forces which lie outside what can be properly called experimental activity.

The most important factor is the established social system and the direction of development it takes. The school is influenced by a number of social factors. Among them, inertia within the system (not necessarily opposition to change) is the most important in understanding the system. Other important components of the system are established economic arrangements, interest groups (for example teacher associations), and commercial producers of teaching aids upon which the school is dependent in order to maintain instruction.

The most important outside influencing forces in instruction are probably the publishing companies. In Norway, textbooks for the school system are produced by private publishing companies. Textbooks are decided upon for the schools through an arrangement for approval that is regulated by law. The publishing companies are dependent on this regulation and usually produce textbooks along traditional lines. They must produce books that will sell which means that they first of all are approved by the MCE, secondly are accepted by the teachers and, thirdly, are relatively reasonably priced (because the individual communities cover the expenses of teaching aids). It is the author's opinion that publishing companies in effect direct much of the development work in education in Norway. One of the main tasks of the NCIE must be to stimulate these companies to revise their approach.

It has already been explained how committee work precedes every school reform. It is the author's opinion that the school structure and educational reform is directed to a greater degree by committee work than by responsible political bodies.

It has been maintained that what particularly characterises educational reform is that it is politically determined. Perhaps this is true only formally. Political influence on committee work lies mainly in the selection of members to the committees, and the Government can to a certain degree direct the committee by determining its composition.

However, as a rule in Norway, school committees are strongly dominated by one group, the teachers. They have, of course, important experience to bring to a school committee. But they are only one group, and there is reason to believe that they will usually be rather conservative. It is therefore not surprising that the results of much of the committee work done in the last 15 years do not appear remarkably radical.

Other groups in society (for example, students, parents, business and industry, etc.) that could perhaps have other views on aims and content have very little influence on the committee work. The co-operation that is necessary among different groups in society in the evaluation of school development leaves a great deal to be desired.

To a certain degree the work of the NCIE has changed this situation. A committee no longer works in a vacuum. It can refer to experimental results, and it can to a certain degree refer to those points in the committee proposals that must be verified by experiments. Up to the present, however, the contact between committee work and experimental work has not been good enough. The whole method of choosing committees is thus put into question.

It is presumably a political question as to how the various influential forces in society should be organised. There can really be no doubt that it is the political bodies which, in the last instance, should direct the development of the school on behalf of society. This is the guarantee democracy offers, that individual interest groups do not take over the direction of society. The author believes that the political bodies have not fully taken into account the interaction which the various forces within and outside the school have for school development. Only when the importance of the various influencing factors is understood will the political bodies have the possibility for directing the process.

Criteria for development of the school system. If it is possible to promote the development of the school, the possibilities of promoting development throughout the whole school system must be considered. The NCIE has the responsibility for only a part of school development work. Usually it treats only the development of its own activities. This is planning on too narrow a scale.

Those factors which contribute to the promotion of all development activities in the school system must be found. It may well be that the measures then used will vary greatly. It is quite certain that, following such a broad policy, all kinds of development activity must be taken into account, activities both long range and short range, as well as experiments both of radical and completely ordinary nature.

What characterises a school system with a good capacity for change and renewal? Lacking supporting experimental data, the author would like to choose three criteria which have been shown to be of great importance in other sectors (business and industry).

1. There should be a short distance between the creator of an idea, the decision maker and the person who actually applies the idea. What does this mean for experimental work? The three parts of the process should be represented in the same group. However, it is unthinkable that

every development measure in the school system can be organised in such a way that these three actors can be found within the same group.

In a centrally directed school system it is obvious that both reform and systematic experimentation are characterised by very complicated teamwork in which the innovators of the ideas come from different groups. As a rule, those who make decisions will be other people (politicians) outside of the system and those who are to put the ideas into effect (teachers) are still another group.

Conditions are different for the development work of individual teachers and in part for curriculum developments. If at all possible, the teacher's energies for creative work should be freed at the same time as he is given greater opportunity for making his own decisions.

2. The school system should be flexible enough to adjust to current needs. It appears that the Norwegian school system cannot meet this requirement. It has been shown above how rigid a centrally directed school system is. As a rule it follows written procedures, regulations and laws. Planning is divided among several bodies and those who have daily experience with the needs have little or no influence on the decisions that are made.

What is characteristic of the centrally directed school system is, in other words, a very slow process of feedback. At times it appears there isn't any such process at all. Decisions are made centrally to a very large extent. The decisions which the individual school can make by itself are very few and often uninteresting in relation to those problems which confront the school. The procedure an individual teacher, student or school administrator must follow to be able to influence a decision is a very long and arduous one. This is evidently the most serious weakness in the Norwegian school system.

The slow feedback process is partly related to the fact that the school does not have clear objective criteria for its "productivity". This makes it difficult to measure the effects that lack of adjustment has on the school's teaching results. When, in addition, the procedure for effecting change is very long and difficult, there is very little reason for teachers to suggest change. The author believes that so many barriers are built into the daily mechanism that any possibility of day to day improvements is obstructed. Thus Norwegian schools have relatively few possibilities for adjusting to current needs. This is true locally and also very probably true centrally.

How must the feedback process work centrally so that the total school system may be able to adjust to current needs? In the first place mechanisms must be established in society that register the needs discussed here. Such mechanisms have been very poorly developed.

Since society has not managed to articulate its needs, the school still operates in a vacuum. In the business and industrial sectors, the work of clarifying educational needs has just begun. Much too little effort is being expended in this area, and the contact the school has with these two sectors of society, aside from the vocational school sector, is very poor.

Other examples indicating that the school system does not have the ability to adjust quickly to current needs are seen in the manner of recruitment to the teaching profession and in the ineffective committees where recommendations are put into effect long after their evaluations have ceased to be current.

There exists, in Norway, a relatively well developed school psychologist service. In some ways this works as a feedback mechanism within the school system. The problems which school psychologists work with are, indirectly, of importance for the development of the school. However, there is no clear mechanism for channelling the experiences of the school psychologist to an organisation that can change the existing conditions.

In some ways the school represents a kind of "stability ideology". The school system is established in such a way that it becomes a world unto itself. This often gives the involved groups a feeling of security, but it hardly results in a good school system.

3. Conflicts in the school system are not solved by regulations and firmly fixed procedures, but are used to stimulate imaginative solutions to problems. Conflicts arise in every system. Where people meet, where they work together, conflicts arise. The problem is only how the conflicts should be resolved. This does not mean, of course, that the structure of the system itself may not be the reason for conflicts. The manner in which we allocate responsibility, authority and duties can be a beginning of conflict. The pressures we place on students, lack of communication and strict examination procedures can be other sources of conflict.

In a school system in which responsibility and authority are highly centralised, the local authorities will, to a great degree, be limited by laws and regulations. Within these are, of course, opportunities for personal judgement, and a good school administrator will presumably be able to create a co-operative climate in which conflicts have the greatest possibility of being solved in a satisfactory manner.

The danger in a centrally directed school system is that conflicts are solved only in a bureaucratic manner by reference to the prescribed regulations. This can only encourage passivity in both students and teachers. It is not unusual that certain rules remain on the books for many years in spite of their untenable nature. In some cases teachers as well as students are able to sabotage them.

What has the solution of conflicts to do with the process of innovation in education? It is obvious that a school environment in which conflicts are resolved in a bureaucratic manner does not encourage creative activity within the system. This again means that the school system does not have the feedback it needs to have in order to be able constantly to adjust to current needs. Unsolved conflicts in a system are the first sign that the organisation is not functioning as it should. When these first signs are choked off by the authoritative rules laid down by central authorities, there is very little possibility for continuous improvement!

This relationship between the manner of solving conflicts and the creation of solutions to problems has general validity in all areas of

the school system, whether the student-teacher relationship, the school curriculum, its objectives, the economy, etc.

Requirements for the school system in the process of innovation. The NCIE was created to promote innovation in the school system. In order to do this, it should then be quite aware of what demands it must make of the system and of its own work within the system.

Communication on all levels is the first requirement that should be made of a school system in the process of innovation. The secrecy which often surrounds the planning process on the central level must necessarily be considered an obstacle to communication. The lack of possibilities which the individual teacher and student have to communicate their needs is another obstacle.

Open channels for communication are a requirement for a fruitful dialogue between the decision making body and those who have to implement the decisions in the system. If the planners, the politicians and others who determine the development of the school are to have continuous contact with the life of the school, the channels of communication should be as open as possible.

At present there is a great deal of talk about school democracy in Norway. This is actually an expression of the fact that the teachers and students want to have some influence in the decisions that are made. There is often weakness in such simple matters as keeping even interested teachers informed on results that could be of use in their own experimental work. A partial explanation is undoubtedly that reporting as well as the more scientific follow-up are time consuming processes. However, this is no excuse for lack of communication.

The school has not been very good at "selling its ideas". Use of the concept of marketing is unknown in the school. It is obviously a question of "selling" ideas in this case. The written report is not a very satisfactory sales instrument. If it is really believed that the results of experiments will benefit the schools, it must be seen that they are "sold" in the system. The use of television, films and modern marketing methods are necessities today. People's time is being competed for. They must be convinced of the quality of the "products".

The author believes that the NCIE has the greatest responsibility for keeping the channels of communication open. It should be sensitive to reactions in the system, and it should itself give out information on plans as well as the results of its activities.

The use of information is the first requirement to enable the innovation process to get started. However, if the contact of the NCIE with the school system is only on the information level, the author believes that it will be unsuccessful regardless of how good the information is.

This year the NCIE is making public its Three-Year Plan for development work in the schools. (See Chapter I). It is obvious that this plan will be of great importance for the direction developments will take in the Norwegian schools in the 1970's. The NCIE is presenting its ideas for open discussion. The NCIE wants all who are interested in the life of the schools to have the opportunity to influence the directives for

school development. Teacher associations, student groups and parent groups are obviously "consumer-interested". All taxpayers as well as governmental authorities are of course directly affected by the plans that are to be tried. For this reason the NCIE wants a debate on its work before developments become too firmly fixed. This is decisive for any favourable innovating activity.

It may be concluded then that neither presentation of information, marketing of ideas, nor communication is sufficient. The necessary lacking component may be the ability on the part of all participants (including the NCIE!) to listen.

Local school units in Norway must be given greater responsibility in experiments. This does not necessarily mean a shift from the central direction of experiments to local direction. It means something quite different: a process of continuous co-operation among all parties concerned, those who create the ideas, those who make decisions on them, and those who apply the ideas in experimentation. All links in experimental work must be forged together as participants, not just as the means to accomplish a particular job. This process is already under way in a number of projects. However it is still not unusual that someone "at the top" in the system will try to "sell" an idea for testing.

The task of the NCIE is to change and improve the school system. This does not mean only presenting proposals for solving problems. Its role must be far more active. It must be involved in making changes in the desired direction. The NCIE must also be in a position to act as an effective surveying body between the forces on the personal and local levels on the one hand and on the national-political level on the other. It must in many ways be a communications and service organ in the school system.

The NCIE has been and always will be the school's "bad conscience", never satisfied with existing conditions. It does not stand alongside the school system, but rather in its midst. This position points out the difference between a traditional research body and an experimental body. The experimental body bears the responsibility for the direction of developments. Its function is more to influence than to investigate.

The NCIE is in danger of becoming a part of the static organisation system even though, by its nature, it is concerned with innovation. For example, this could happen by its insisting on an innovation policy that it wants to carry through regardless of opposition and obvious weaknesses.

It has been shown that the generalisation effect is dependent on objective follow-up. The NCIE must set strict requirements for the follow-up of its own work. This can be done with informal talks, good communications and the aid of teachers' reports on the various projects. As a rule, however, this will not be enough. Increasingly greater quality is demanded of the experimental projects in the schools. They must, therefore, be followed up by verification. The author believes the NCIE has the responsibility to develop evaluation instruments that measure the aims and achievements of the projects.

There is inherent conflict in these points. The NCIE, with its close ties to the MCE, is very much in danger of engaging more in experimental policies than in objective experimentation. Possibly the best solution would be to separate the responsibility for running experiments from follow-up.

VII. PRACTICAL CONSEQUENCES OF INNOVATION FOR EXPERIMENTAL WORK

Expansion of local administrative responsibility. The above paragraphs indicate that the Norwegian school system is over-centralised in its decision making processes, with a resulting negative effect on the process of innovation. Is innovation promoted by decentralising the decision making process? Decentralisation is no panacea. In so far as it affects the development work of the individual teacher it is obviously an advantage. But where more advanced experiments are concerned, the situation is a different one.

Some development projects are that large units are necessary to make implementation financially feasible. Teaching/learning systems, with a combination of methods, materials and organisation, will generally require large expenditures and specialists from various fields. Thus experimental work must be centralised. Some projects have consequences for the whole nation, (e.g. school structure). They cannot then be decided at local level.

The problems in the innovation process are neither solved by centralisation nor by decentralisation. The statement of the problem is incorrect. The question is rather: in the process of innovation, what projects and what responsibility can better be resolved by large units rather than small units, and what projects can better be resolved by small units? As has already been implied, large experimental projects require large units. Smaller projects can be taken care of by smaller units, often by the individual teacher. A crucial requirement in all experimental work is good communication at all points in the process.

The NCIE believes that Norway must expand the service units in the local system. From these the schools can be given help in their development activities. Even relatively simple educational development work today requires simple teaching aids, compendia, audio-visual aids, etc. In an individual school the teacher is seldom given the service he needs. The projects become too big for him alone. At other times the teacher needs information, inspiration and stimulating ideas in order to be able even to start any development work. The NCIE believes that local educational service centres can give this service.

The educational service centres will act in close co-operation with the NCIE and other central service units, to give the teachers the necessary support (e.g. evaluation and techniques). The service centres can also serve as communications links between the schools and the NCIE. It is hoped that, through this activity, original ideas will be created that can be further built upon in larger experimental projects.

In 1969, four service centres will be in operation in Norway. If this arrangement is successful, the NCIE will recommend that similar arrangements be carried out throughout the country.

The establishment of service centres is, in one way, a part of the old "dissemination theory". That is, NCIE field experiments can be disseminated more easily to the country's schools. At the same time, it is a recognition that experimental work locally must be stimulated and offered opportunities for growth.

The NCIE intends to go one step further. A new project, as part of a new experimental strategy, will begin in the spring of 1969. The purpose of the programme is to offer each individual school the opportunity for self-development beyond the possibilities that are already available.

The programme, which is being worked out in co-operation with the Institute for Organisation Development (Oslo), aims at training teachers and students in the critical evaluation of existing working conditions. It is composed of three parts and has clearly defined objectives. (See Appendix 3). With the aid of intense group work and suitable instruments for measuring group reactions, the school will be able to define its "status". The programme will then also aim at helping the teachers and students to define the aims they have for their work. Finally, a development programme for the school for the next few years is to be established. In this last phase it will be necessary to have help from outside, both from the existing service centres and from the NCIE.

The main objective is that the school itself will propose the measures it finds necessary. If the school wants to go beyond what the laws allow, it should also be possible to achieve this in co-operation with the NCIE. It is intended to offer the plan to all schools in the country if experience proves that those schools that have carried out the programme in the primary experiment have arrived at a development plan that is feasible.

Up to the present time, the source of experimental strategy has been the NCIE and its practical programmes. Often, of course, these ideas have had their origin in the evaluations made by the teachers. As a rule it is the individual teacher who has had the ideas for important projects. Even so it has not always been possible to disseminate the practical experiments to other schools. Where it has been a question of purely administrative and organisational ideas, it has been possible to carry these through using laws and regulations. It has been more difficult, however, to disseminate ideas for the renewal of the inner life of the school. The author believes that this is closely related to the fact that a renewal of the school's inner life is dependent on the participation of the teachers and the students and of their own involvement in the process.

The role of the NCIE in the school system will, of course, be a different one than at present. There is reason to believe that the NCIE must to a greater degree be a service body for the needs which the schools articulate. Presumably the schools will clarify their needs far more explicitly. Besides implementing larger development projects (systematic experimentation) which the schools undoubtedly need, the NCIE will perhaps be forced to accept their consequences by taking a new role.

It is possible that this plan will lead to such a great burden of work that the NCIE will not be able to continue as previously. The author however feels confident of the benefits of a re-organisation in accordance to the need for innovations in the schools. It is the author's

hypothesis that an interplay between the NCIE and individual school units will lead to a fruitful dialogue that has great possibilities of being successful. This means that the school system can enter into a planned renewal process of far greater extent than previously seen.

On the one hand, the individual school units must take the responsibility themselves at the local level. They must be given the opportunity to become self-developing. In the author's opinion, the work of development must begin where the schools are willing to begin, and it must consider the tempo of development suitable to the individual school.

At the same time, the NCIE has two functions. It must serve both as a service body and as a development body. As a service body it helps the individual schools carry out the overall development programmes for the schools. As a development body it implements large practical experiments that lie far in advance of the programmes for the ordinary school. The NCIE must work on far reaching projects in order to offer larger prospects for the work of innovation. The NCIE can contribute beneficially to the dialogue by pointing to its own results and to those of other development bodies. In this way the development programmes of the individual school can be revised relatively early and be replaced by a more radical programme for renewal.

If innovations are really to enter effectively into the school system, they must pervade the whole system, including the administration. There is a danger in the establishment of a special research and development body in an organisation. The rest of the system may easily accept this as meaning that the experimental body will "take care of" the development activities while the rest of the system remains unchanged.

The development body must first and foremost consider its task as being one of initiating change. It is not to be the operative body. Other bodies should take upon themselves the work of development. The administrative body of the individual school should be responsible itself for the development work.

The development body must do its part to see that this becomes a reality. In the beginning phase, the development body will, as a rule, have to take upon itself the implementation of innovations. For certain types of project this will perhaps become a permanent arrangement.

The NCIE report to the MCE and the Storting for 1967, entitled "The Division of Work between the National Council for Innovation in Education and other Educational Advisory Councils", gives a helpful statement about the NCIE role in development work. (See Appendix IV).

The role of the teacher in innovation. It is most important to evaluate whether the role played by the teacher today serves the objectives which the school wants to realise. A constant renewal of its work is presumably a matter of the greatest importance in enabling the school to better achieve its aims.

The role of the teacher is, in general, to instruct. There is little or nothing in the system that encourages him to participate in development work. The education of the teacher, the system of wages (the teacher is paid for instruction time, not the amount of time he actually works),

the lack of service institutions, etc., make development activities an extra burden. This is often more than the ordinary teacher can manage.

Individual teachers already play an important part in the work of innovation. They may begin with their own educational development projects, or contribute to centrally directed experimental work, or take part in committee work, etc. However, the ordinary teacher is relatively unaffected by this work. He does not participate in initiating innovation. As a rule he has innovations imposed on him after they have already happened. As far as the author is aware, no investigation has yet been undertaken in Norway of the type of teacher who participates actively in innovation. It would obviously be interesting to map the motives for this work.

The teacher must feel that development work will benefit him at his own work. If this is to be the case, he must not stand alone. Educational service centres must give him the assistance he needs. Further, he should receive supplementary wages for any 'overtime' connected with experimentation. (This is already the case in Norway).

It is possible that there are also other methods of stimulating teachers to active participation. The possibility that development work will formally qualify a teacher for a new position should be evaluated. Today the principle of seniority is used in filling most positions. Active participation in development work will actually become useful experience that should have weight when filling positions. Formally speaking, there is no basis for this today.

The role of the student in innovation. Very little attention has been paid to the wishes of the students in the work of development. The newly developed teaching/learning systems however, have been tested and evaluated according to student reactions. In a sense then, students are "participating" in the process of development.

Students should participate in development work as a group. They represent a valuable source of ideas for renewal. The NCIE has already begun contact work with student representatives. Expanded experiments are currently being undertaken on "school democracy" that build on fairly long traditions in this field. Participation is important particularly at the senior high school level and in the teacher training colleges, but it should also involve students in the junior high schools. What kind of learning can be established without deep involvement from the students themselves?

The role of the parents in innovation. In Norway, parents of students traditionally are not organised as a group. In the local school units parents do not as a rule comprise a group of any force, and very little initiative is shown by them. The schools are run by the teachers and the popularly elected school boards.

It is very difficult to get Norwegian parents actively involved in the development of "their" schools. Those parent-teacher meetings that are arranged by the school are usually attended by the parents of the "successful" students. They are often conservative in reaction to experimental plans. They undoubtedly are afraid mainly that "something new" will damage their children's chances. Those parents who perhaps need the

guidance and help of the school to the greatest degree, and those who could best help the school, are often absent from the parent-teacher meetings. The author believes that one reason the parents stay away is the feeling that they do not have any possibility of influencing the school. They feel that their proposals would not have any influence on developments and would probably be considered untimely interference.

Parents, of course, represent a very important factor in the innovating process of the individual school. Social and economic background is of decisive importance to the individual development of students. It is important, therefore, that the schools have the best possible contact with their parents and come to understand some of their impulses in order to improve the educational opportunities for the individual student.

A model for the process of innovation in education. The process of innovation in education in Norway, which up to the present time has been centrally directed, should be divided among several bodies according to the type of experiment. An effort should be made to try to discover which projects can best be carried out by smaller units and which can best be carried out by central bodies.

The following model for the direction of the process of innovation in education in Norway is similar in its main features to the proposals now being discussed in the Storting. The form of this model is the author's.

1. The individual teacher. What has been called here "the development work of the individual teacher" is the responsibility of the individual teacher and the individual school. Within the existing laws and regulations, this does not require any central approval. The individual school should be able to present its own development programme. When necessary, assistance can be obtained from the educational service centres, the expert advisory council for the particular type of school and the NCIE.

2. The expert advisory councils. The expert advisory council for each type of school has the responsibility for that type of school's "rolling reform" work (for example, curriculum development). This responsibility includes experimental work, the objectives, methods and content of which may differ from the present arrangements but do not, as a whole, set lower instruction standards. Possibly the expert advisory councils should also be given the responsibility for the implementation of the big practical experiments that are developed by the NCIE in their primary and field experiments.

3. The NCIE. The main tasks of the NCIE are to treat the experimental work of the school as a whole and to stimulate all forms of experimentation.

The NCIE should carry a reform activity (mainly structural changes) through the phase of testing in preliminary and field experiments. It must not be the responsibility of the NCIE to disseminate the reform throughout Norway. This should be done as part of "rolling reform" work by the expert advisory council of the particular type of school involved.

The NCIE should then develop larger systematic experiments in education. These must be planned and evaluated thoroughly. In this activity, the NCIE will be the school's main contact with the research institutions. As a rule the research institutions, in co-operation with the NCIE, should be responsible for the scientific follow-up of the projects.

The above policies mean a decentralisation of experimental work. A more flexible treatment of experiments and reforms is then made possible. All parts of the school system become activated in the process of innovation. However, it also makes the establishment of both central and local service institutions necessary. In the context of the present one-sided centralisation of the decision-making process in the Norwegian school system, this is an important step in the direction of a division of responsibility and projects among central and local authorities. In the author's opinion, this development is necessary and in itself an important innovation!

The model in fact divides the responsibility for different reforms among different groups. The students, parents and teachers should be responsible as much as possible for the daily work and development which influence only their own world. Until now in Norway, such development has been over-influenced by central authorities. Innovations, however, which influence a big group, e.g. a total community, cannot be carried out only as a student/teacher responsibility. Democratic decision-making has to be taken at the community level with, of course, participation also from students, parents and teachers. There are also some innovations which influence the whole nation, for example, structural changes. The only democratic way to make decisions would be through Parliament, which has the highest democratic responsibility to deal with the innovations which influence all inhabitants. Here again the development itself should be carried through by optimal participation. There are of course also innovations which have international implications. It is important to create closer co-operation with other countries to ensure the same policy towards these developments.

VIII. RESISTANCE TO CHANGE IN THE SCHOOL

Everyone who has been involved in experimental work recognises the expression "resistance to change!" Change, of course, should not be considered positive without due consideration. Regardless of the area of life involved (the introduction of new techniques, new organisational forms, or new social forms), changes create a certain amount of negative reaction.

Opposition to change is a general phenomenon. It can often be frustrating to innovators and researchers. These people will, of course, usually be convinced that the changes are for the best, at least from their point of view. Many innovators are placed in an unfortunately defensive position when they come to introduce innovations. The innovator often comes to consider that resistance to change is one-sidedly negative. This again creates difficult conditions for co-operation and can perhaps become an obstacle to innovation.

Even though the conditions for innovation are made as favourable as possible, normally someone in every system will react against any change. Innovations in the school will meet resistance from several groups: the teachers' group, the parents' group, the students, and the administrators and politicians. There are several kinds of resistance which must be met: psychological, practical and ideological.

Groups which resist change.

1. Teachers. A number of the conditions of innovation are considered to be a threat by the teachers. Several of the systematic experiments require a new role of the teacher. This can obviously be felt to be a difficult transition. Other experiments require supplementary education in a discipline. This means extra work and, possibly, extra expenses and a loss in wages. The experimental work itself is often demanding. In attempting to introduce a reform, the teacher will often not be able to carry through the aims of the instruction plans because satisfactory textbooks and other teaching aids are lacking. The teacher thus fears being indicted for the possible poor results. Many teachers probably avoid development work because they fear that it will demand so much of them that their students' achievements may suffer.

Particularly the structural experiments that require co-operation among teachers of different subjects are often opposed. Also, demanding co-operation of teachers with higher education and those with a less solid theoretical background at the same school is not always considered to be desirable.

The necessity of co-operation with groups newly introduced into the school such as advisors, psychologists, technical experts and assistants creates unrest and confusion among the teachers. The old role of

the teacher is regarded as being a safer one. The new specialists, in the opinion of many teachers, do not have adequate "understanding" of the problems.

2. Parents. Resistance to change in the school by the parents' group is often related to the fact that the present school appears to act as a selection mechanism for further education and for professional careers. Thus, in the eyes of the parents, a most important role of the school is to ensure that at least some children acquire the necessary qualifications.

There is a strong climate of competition in the Norwegian school. Competition to enter the several "closed courses" in the universities and institutions of higher education has an effect downwards through the educational system. Experiments that threaten the achievement of proper qualifications for the "closed courses" will therefore be regarded with suspicion. The same is naturally also true of experiments in which examination forms and kinds of testing are changed.

Emotional opposition to "experimentation" with children may be another possible cause of resistance. Psychological research has given parents the impression that school experimentation can border on dangerous manipulation of their children. Similarly, many parents claim that young children in particular must be protected from too many variations in the structure which might create insecurity and physical and emotional difficulties.

3. Students. Students often use many of the same arguments against experiments that their parents have used. This is particularly true of students in the senior high schools where competition for achievement of a particular competence for qualification is strong.

Innovations in the curriculum and new methods of instruction will, of course, be disturbing to many students. Innovators, who claim that most students are happy with experiment and development in their schools, are undoubtedly correct. However, it is obvious that there are also groups of students who react negatively.

The last few years have shown that students themselves not only want to influence and participate in developments but also to direct items. The author thinks that this development will probably increase in importance. This will of course change the responsibility for innovation and in a dramatic way change the roles of existing decision-making bodies. There is no single solution to this development. Students should have an increased responsibility in innovation. On the other hand, they are not the only responsible persons in the process. The next years will show whether the educational system is able to find a solution to these conflicting interests or if the students will move into an even more revolutionary phase.

Nature of resistance to change. Changes in social forms and the human environment create insecurity. Most people in Norway are presumably brought up in a relatively stable environment. Major variations in the life situation are considered threatening, and it is not unusual to find the reaction of fear. In the extreme, aggressiveness and apathy may be other reaction patterns.

There is obviously a threshold value of how much change students, parents or teachers will tolerate in daily instruction. The author does not believe that enough work has been done on this question. Many innovations which have been prepared and carried through have made unreasonable demands on the ability of both the students and the teachers to adjust to change. Systematic work must be done to develop a reasonable progression in the projects so that adjustment to innovation and change may be made easier.

Many psychological problems could doubtlessly be prevented by good information, well-prepared qualifying courses, good subject material and open discussion among those involved. The NCIE has tried to work along these lines but has only been partially successful. Our experience may have radical implications for the strategy, mainly towards a decentralisation of innovations.

The author believes that much of the resistance in the schools to experiments is due simply to the fact that the teachers are not convinced that the measures are justified. One of the explanations may be that the teachers do not find the resulting "products" good enough! For instance, there is a good deal of talk about the benefits of a new role for the teacher, learning by self-instruction, etc., but how many of the developments can be proved to be superior to old methods? There is reason to doubt that all experimental projects actually fulfil what they promise. As long as it is not possible to present objective results that actually show that the new measures mean real progress in the instruction situation, many people will, and rightly so, be reluctant to accept them.

A teacher must weigh the justifiability of a project that, in spite of its qualities, will have many side effects (for example, on practical application, adjustment to the rest of the school work and to the daily routine). The disadvantages, from a purely practical point of view, can be so great that they offset the advantages the project means on the educational level.

In the author's opinion, there are several experimental projects which do not take into account the school situation as a whole. A project may very well be an excellent one, but considered in a wider sense, it can present problems.

What has been implied here is simply that experimental projects must fulfil stricter requirements of objective planning and control. For example, when a teaching/learning system is to be introduced into mathematics, it is not sufficient just to investigate what takes place in mathematics classes. The follow-up must also investigate the total instruction situation. Questions must be asked such as: will this particular project have consequences for the rest of the instruction? Will there be problems of fatigue, discipline or other difficulties as a side effect in classes other than the mathematics class? Teachers, students and parents, all have the right to be fully aware of the possible effects of a project if it is to be introduced into the system generally. What is advocated here is a systematic approach to innovation.

Every plan undertaken in the school presupposes certain ideas, opinions about upbringing, a certain philosophy or a definite ideology. The introduction of a new school structure, the extension of the school day, new teaching methods, new roles for the teacher and the student are all measures that have an ideological basis.

Innovations will usually favour certain facets of the school's total objectives. Development projects, as a rule, aim at making the learning process more effective. Projects that change the traditional relationship between teacher and student may aim at creating a more critically oriented student with greater independence in regard to the subject material and to the teacher. Projects for broadening the range of social groups recruited to the school (from other levels than the higher social groups) emphasise social objectives over strictly educational objectives.

Resistance to experiments can be due, consciously or unconsciously, to their ideological content. The interaction among the various aims of the school and the shifting of objective priorities that experimental work means, is seldom sufficiently clarified. The author suspects that the innovators themselves are not very aware of this shift and it is far less clear than it could be in the presentation and implementation of the innovation.

A great deal of the resistance to experimental work is indirectly due to uncertainty and doubt about its ideological basis. An open dialogue on these questions is needed to clarify the issues and to prevent further problems. These questions cannot be solved by "social engineering", "change agents" or any "marketing approach". That would be a failure that would completely destroy the possibilities for innovation.

IX. CONCLUSION

The purpose of this study has been to elucidate the functions of the NCIE in order to understand more clearly the process of innovation in education in Norway. The author has taken as his starting point the activities of the NCIE and has tried to show what actually has been achieved in its innovation work during the first 15 years of its existence. The interpretations of the experiences presented in this study are entirely the author's and have not been verified by systematic research.

Experience gained from the work of the NCIE has been the basis for reinterpretation of the NCIE work strategy, beginning with a theoretical model for innovation in the school system. In recent years there has also been thinking along new lines concerning the work of the NCIE itself.

The author has tried to bring into this study other forces in the overall education system that influence the process of change. Some topics deserving of treatment in another study would be the structure of the NCIE, the co-operation with producers of learning aids, the "marketing" of change and the recruitment of personnel for innovation projects. A conscious decision to limit the scope of the study accounts for the very incomplete attention given to these topics here.

A word must be said however about the recruitment of personnel. This is particularly difficult for a small country like Norway. Today it appears that Norway cannot solve the problem of staffing its development projects alone, even with the maximum utilisation of existing qualified people in research institutions, schools, etc. As far as Norway is concerned, international co-operation is necessary. The logical solution is co-operation within Scandinavia, where the school systems are very similar. Such work has already begun. It is the author's sincere hope that it will not be too long before Scandinavia at least can be considered as a natural unit for the recruitment of personnel for innovation and experiments in the schools.

APPENDIX I

EXCERPT FROM THE "INNOVATION IN EDUCATION ACT"
OF 6th AUGUST, 1964

Regulations concerning the National Council for Innovation in Education

Chapter III

1. "The National Council for Innovation in Education is lawfully nominated by His Majesty. It shall be the duty of the Council to serve the Ministry of Church and Education with advice, initiative and supervision upon such matters as are connected with experiments in education.

2. "It shall be lawful for His Majesty to appoint a Director of Innovation in Education to be the executive officer in charge of the administration and supervision of experiments in education, subject to provisions authorised by the Ministry of Church and Education. The Minister shall appoint the necessary secretarial staff. The Council may, with the consent of the Minister, retain experts.

3. "The members of the National Council for Innovation in Education, one of whom is to be Chairman and one of whom is to be Deputy Chairman therefore, shall be nominated by His Majesty for a term of office of three years at a time.

4. "The Council shall have a Steering Committee of three, on which the Chairman and the Deputy Chairman of the Council shall serve as ex-officio members. The third committee member shall be elected by the Council for a term of one year at a time.

5. "The Council shall have two regular meetings per year, and other meetings when, or if, the Chairman or the Director of Innovation in Education or at least two other councillors should deem it necessary. A Council meeting can be called at one week's notice.

6. "All matters of policy shall be dealt with in plenary Council meetings, where a quorum is constituted by a majority of the councillors. Otherwise the Council shall itself decide what powers should be delegated to the Steering Committee. Decisions are made by a majority vote. If the votes are equal, the Chairman casts an additional vote. Records shall be kept of the proceedings of the Council and of the Steering Committee. A transcript of the minutes shall be referred to His Majesty's Minister. If a member should not agree on a resolution, he can record his vote of

dissent. The Council shall give notice of dissent, if any, when its recommendation in a case is submitted to the Minister.

7. "Expenses in regard to the National Council for Innovation in Education shall be defrayed by the State from the budgetary appropriation for the year in question. The Council shall submit budget estimates to the Ministry of Church and Education."

APPENDIX II

STATE LAWS AND REGULATIONS CONCERNING THE SCHOOL SYSTEM

A. Laws

There is a separate law for each type of school. A law contains articles defining: purpose, principles for the organisation of instruction, length of an instruction period, and the curriculum. (The curriculum is fixed in set instruction plans by the MCE). Also included are directives concerning: classrooms and equipment, questions of discipline, instructions for personnel, wages, and employment and dismissal. Other directives treat: division of expenses between State and local community, administration, and textbooks.

B. Regulations

The regulations contain directives in greater detail concerning the activities of the school. These too are fixed by the MCE. The regulations specify the yearly examinations which are given on the basis of a common curriculum in all schools of the same type. For certain examinations, a common basis for grading is fixed for the whole country.

C. Financial regulations

1. Elementary schools. Both the State and the Counties give communities important subsidies for the elementary schools. These subsidies vary according to the economic status of the community. In addition, the State subsidizes teaching aids at 50 per cent of the minimum requirements, and the county subsidizes school construction at 50 per cent of total cost. (In individual cases, the State will also subsidize school construction).

2. Senior high schools. The State subsidizes the senior high schools by type on the basis of a certain sum per regular student. For example: about 4,000 Norwegian kroner per regular student in the senior high school (gymnas), and about 9,000 Norwegian kroner per regular student in the agricultural high school.

The State grants subsidies to the Counties according to their financial situations. The subsidies vary from 30-75 per cent of all educational expenses.

3. Teacher training colleges. The State pays all expenses at the teacher training colleges.

APPENDIX III

THE PLAN FOR LOCAL SCHOOL SELF-DEVELOPMENT

A. The three parts to the plan

1. A basic book in organisational practices with examples and projects taken from the practical every-day life of the school.

2. A course for the teaching staff and representatives of the students in which group work, self-evaluation and development are measured with suitable instruments.

3. A follow-up at the school of the resultant development programme. A course in co-operation techniques integrated in the daily instruction of each class is included in the plan. Some co-operation with the NCIE or other development bodies in the realisation of the development plan may be necessary.

B. Objectives of the plan

1. To create an open, problem-solving environment within the individual school.

2. To give the responsibility for the solutions to problems and decision-making as much as possible to those who have the relevant information, that is to those in the local school.

3. To expand trust among teachers, students and others connected with the school.

4. To strengthen the drive towards clear joint objectives, and to increase the co-operative efforts towards these objectives to the maximum.

5. To increase the feeling of the teachers and the students that they "own" and "master" the school, its organisation and working environment.

6. To help the teachers at a school to carry out the process of education on the basis of relevant objectives, rather than on the basis of "established practice".

7. To increase the "self-guidance" of the teachers and students and their freedom to work towards independent objectives within the framework of the legal structure.

APPENDIX IV

EXCERPT FROM THE NCIE REPORT TO
THE MCE AND THE STORTING FOR 1967

"The Division of Work between the
National Council for Innovation in Education
and other Educational Advisory Councils"

"Which of these projects: educational reform, educational development work, demonstration innovations, applied school research and practical experimentation should the Council work on? Up to the present time, the NCIE has been working on reform projects and practical experiments. Some educational development work has also been taken up by the NCIE. There is no clear dividing line between the various types of development work in the school, of course, and therefore it is difficult to achieve a clear division of labour.

"In principle the NCIE must be interested in all projects that can bring the Norwegian school closer to a realisation of its objectives. This must mean that either the NCIE itself takes the initiative for and administers the projects or that it encourages and supports other bodies to do so.

"In recent years the NCIE has engaged in co-operative work with other educational advisory councils. Contact committees have been established between the NCIE and the Council for Teacher Education, the Council for Special Schools, the Council for Elementary Schools, the Council for Vocational Training for Handicrafts and Industry, and the Council for Senior High Schools to discuss matters of common interest to the two councils.

"Experiences from this contact work are positive. The planning of experiments can be discussed and given priority in a larger forum where subjects are given a broader elucidation. The handling procedures are eased and the discussions of the projects by the two councils become much simpler than they were before. However, this co-operation has not aimed at any division of work among the councils, but rather co-operation in the preparation of the matters at hand.

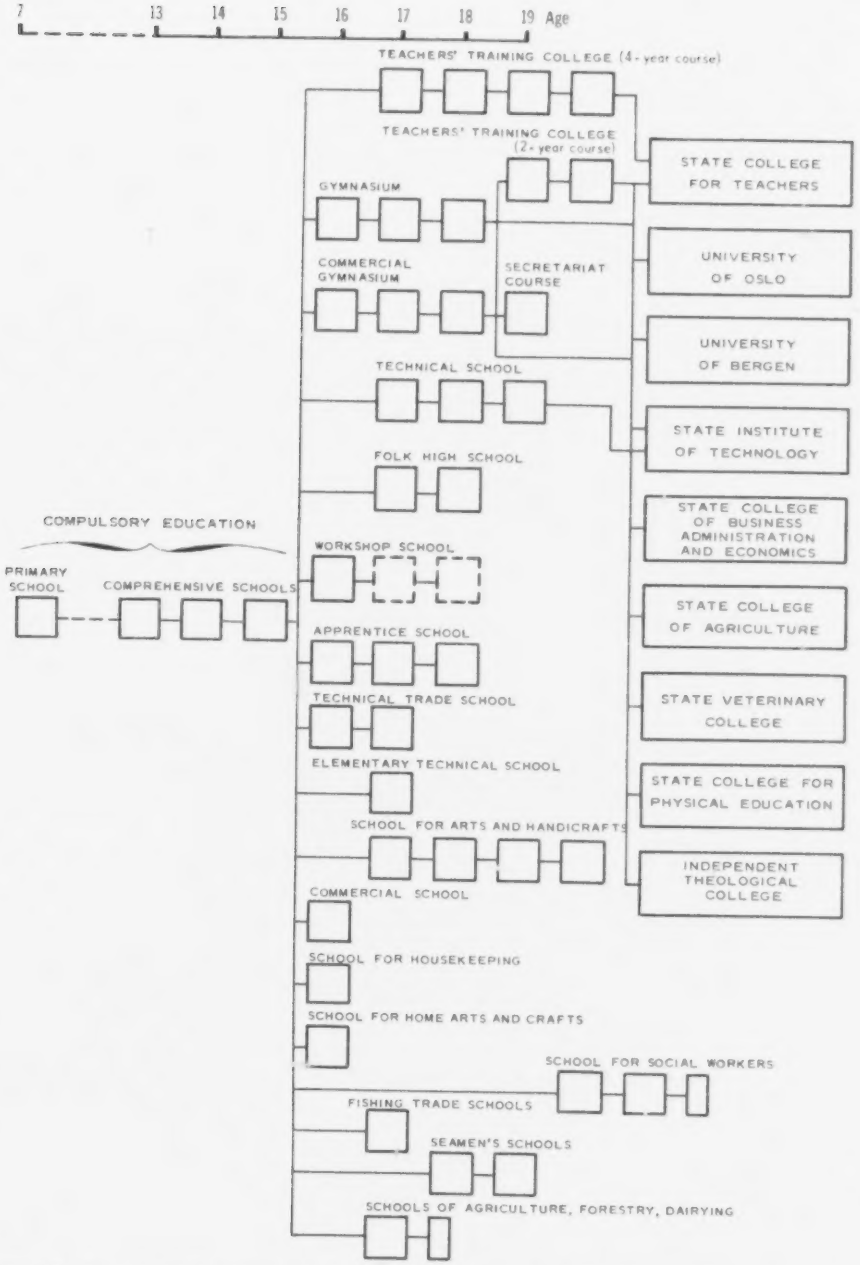
"Experiments in the schools are steadily increasing in extent. The NCIE is aware that the great expansion of experimental activity in the senior high school and at the teacher training colleges will lead to large problems at the Secretariat. This is one of the reasons that the NCIE considers it desirable to arrive at a division of the work among the councils.

"The most pressing reason the NCIE considers it important that all of the councils work on the planning of experiments is that this collective work will lead to greater efforts in experimental work. A precondition for the allocation of the work projects is, in the opinion of the NCIE, that all projects be evaluated and given priority ratings by the existing contact committees.

"The NCIE believes that there are grounds for discussing two types of experiment that can be undertaken to advantage by the respective councils. First, there are the less extensive experiments that in this report have been called the development work of the individual teachers. This work should be strengthened and is a very important part of the whole. Then, there are the more extensive experiments which have been tested to a satisfactory degree (in primary experiments and, in part, in field experiments) and should be put into effect on a national scale by the councils involved (if approved by the MCE)."

Figure 1

THE NORWEGIAN SCHOOL SYSTEM

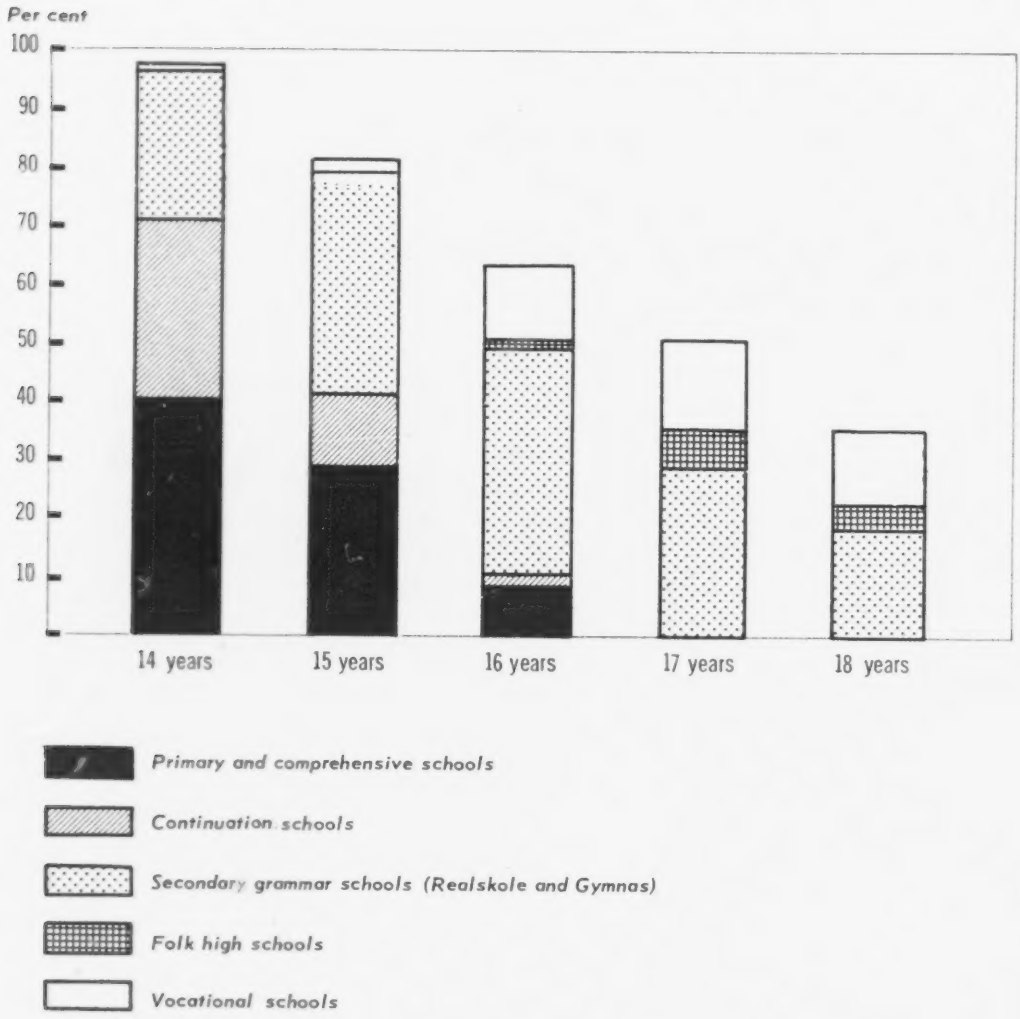


Note: The diagram gives the structure of the Norwegian school system. The 9-year compulsory school (for ages 7 to 16) is shown in relation to the diverse forms of senior high school (generally for 3 years, ages 16 to 19). There is an evident need for coordination of instruction in the senior high school.

Source: Hove, Olav: *The system of Education in Norway.*

Figure 2

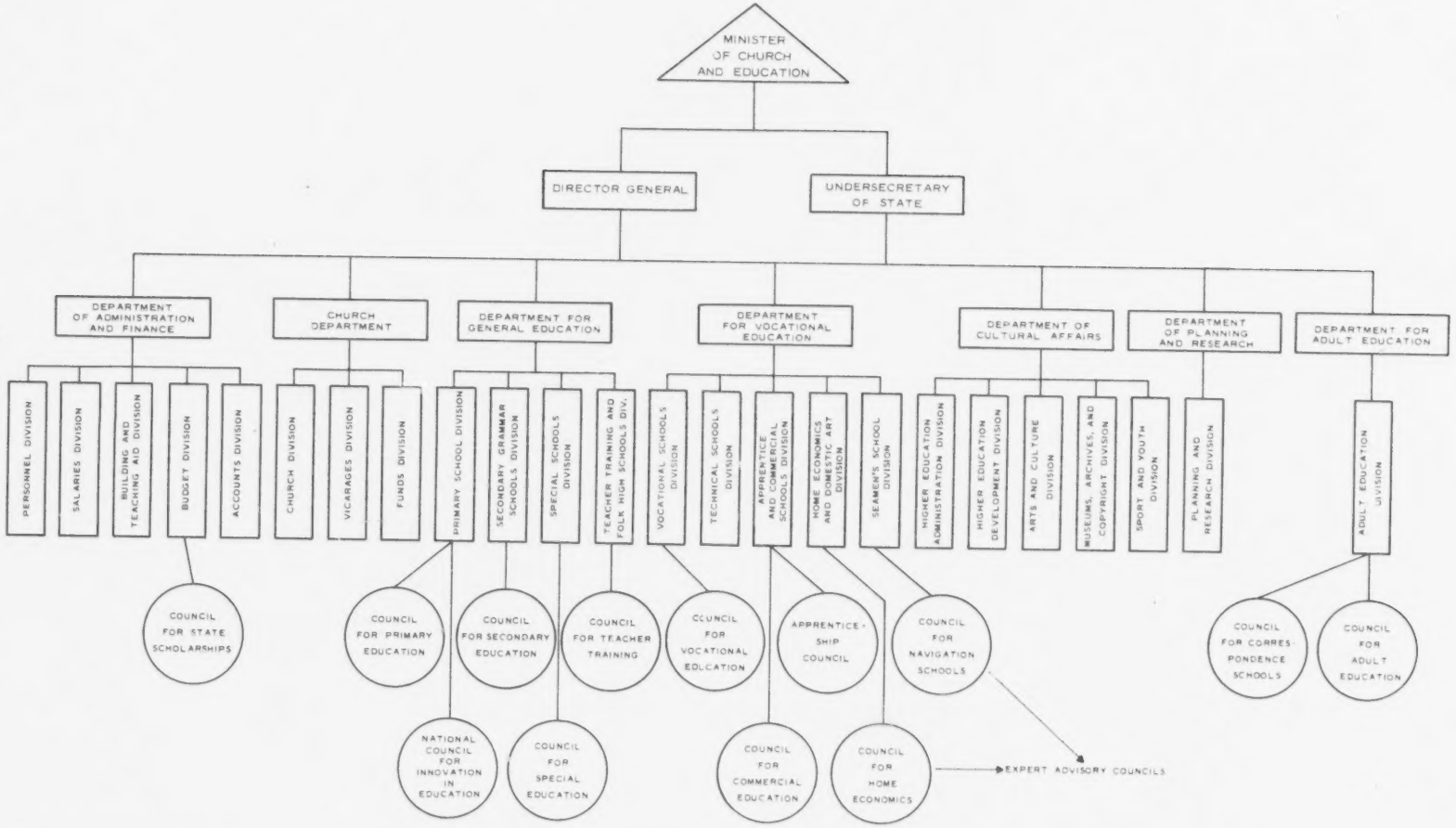
ENROLLMENT IN VARIOUS TYPES OF SCHOOLS IN 1966



Note: The diagram shows the percentage of each age group attending school in 1966. For example, 40 % of the 14-year age group attended the 9-year school in 1966. Today the figure is about 65 %. Presumably by 1975 the all students in the 15-16-year age groups will complete the 9-year school. The development of the 9-year school will then have been put into effect throughout the country, and the continuation school and the junior high school will no longer exist.

Figure 3

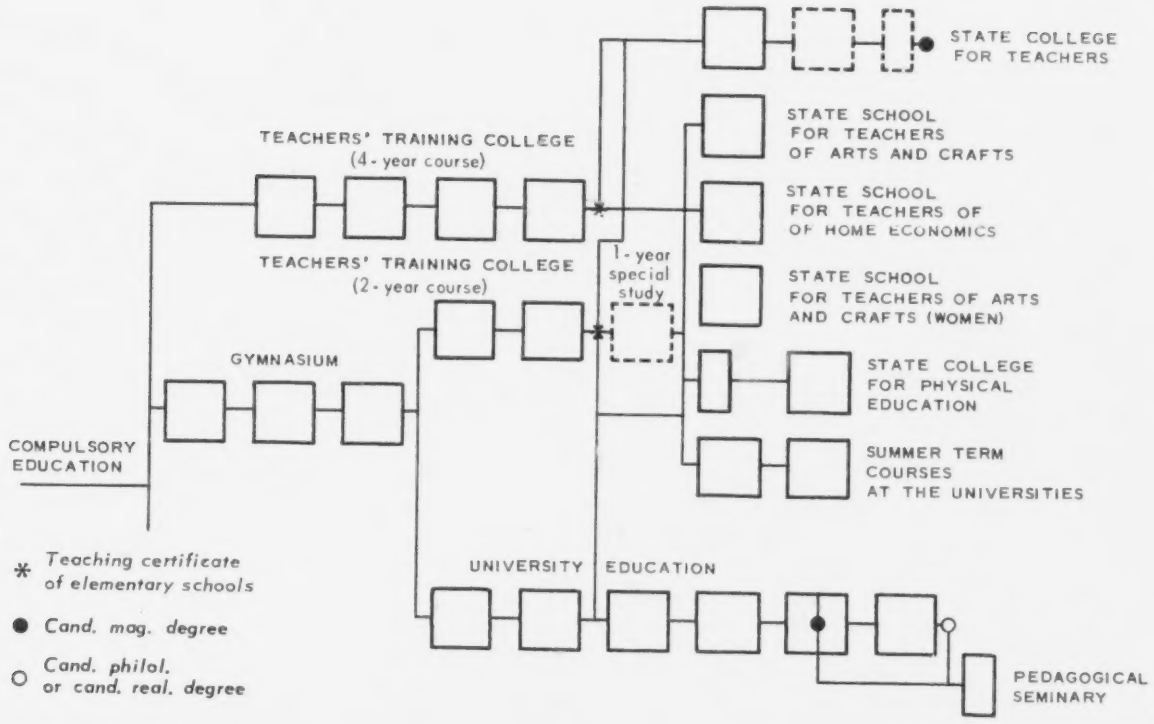
STRUCTURE OF THE MINISTRY OF CHURCH AND EDUCATION



Note: It should be noted that each of the Divisions of the three Departments of Education has at least one "Expert Advisory Council". These councils are not a regular part of the MCE. They are appointed by the King and have a autonomous advisory task. The NCIE has a special role: while its work concerns all types of school, it is linked to the MCE through the Primary School Division (which also functions as a "general office" in the Ministry).

Figure 4.

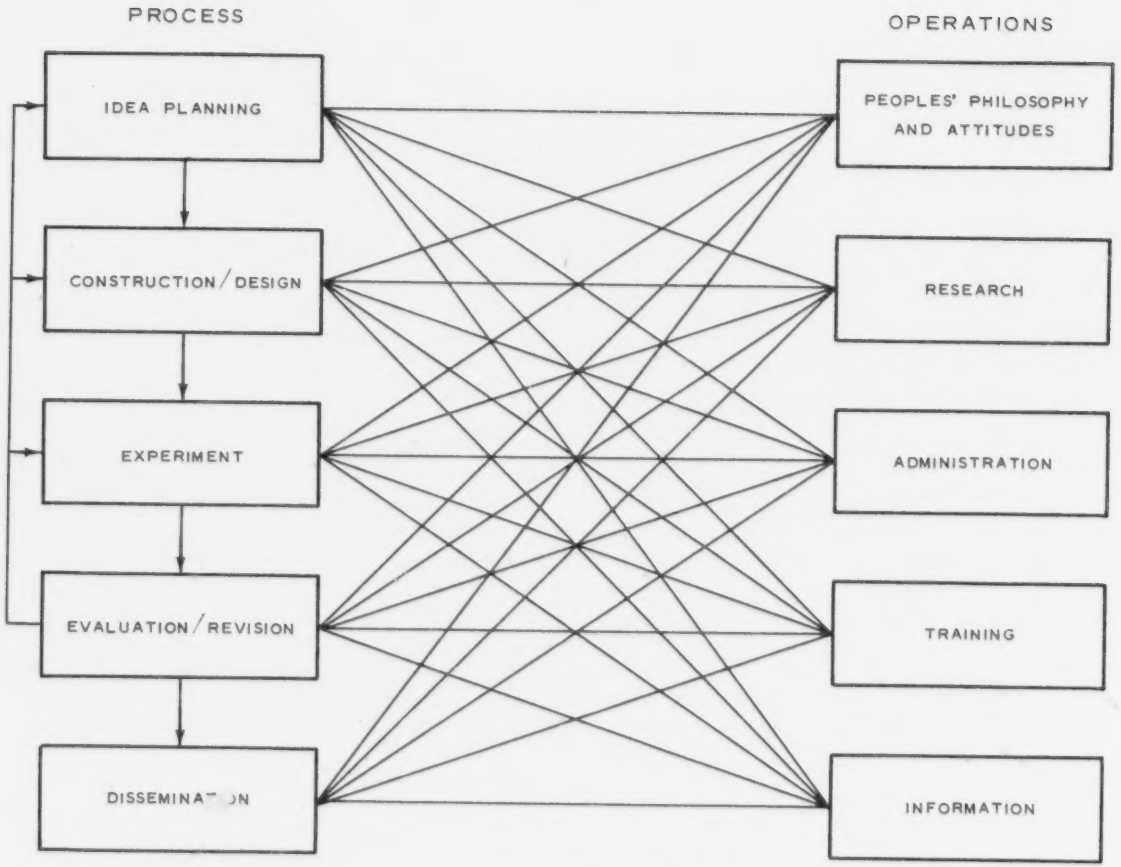
TWO-LEVEL SYSTEM OF TEACHER TRAINING


STATE COLLEGE FOR TEACHERS
STATE SCHOOL FOR TEACHERS OF ARTS AND CRAFTS
STATE SCHOOL FOR TEACHERS OF OF HOME ECONOMICS
STATE SCHOOL FOR TEACHERS OF ARTS AND CRAFTS (WOMEN)
STATE COLLEGE FOR PHYSICAL EDUCATION
SUMMER TERM COURSES AT THE UNIVERSITIES
TEACHERS' TRAINING COLLEGE (4-year course)
TEACHERS' TRAINING COLLEGE (2-year course)
1-year special study
GYMNASIUM
COMPULSORY EDUCATION
UNIVERSITY EDUCATION
PEDAGOGICAL SEMINARY
* Teaching certificate of elementary schools
● Cand. mag. degree
○ Cand. philol. or cand. real. degree

Note: The diagram shows the organization of teacher training in a two-level system. Both the teacher training colleges and the universities train teachers for the comprehensive school.

Figure 5

THE PROCESS OF SYSTEMATIC THINKING



Note : The diagram gives a more complete picture of the process of systematic thinking in practical experimentation. The process will, at all points from idea planning to formulation, trial, revision and dissemination, be influenced by the working operations in the column to the right.